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A Database Publication

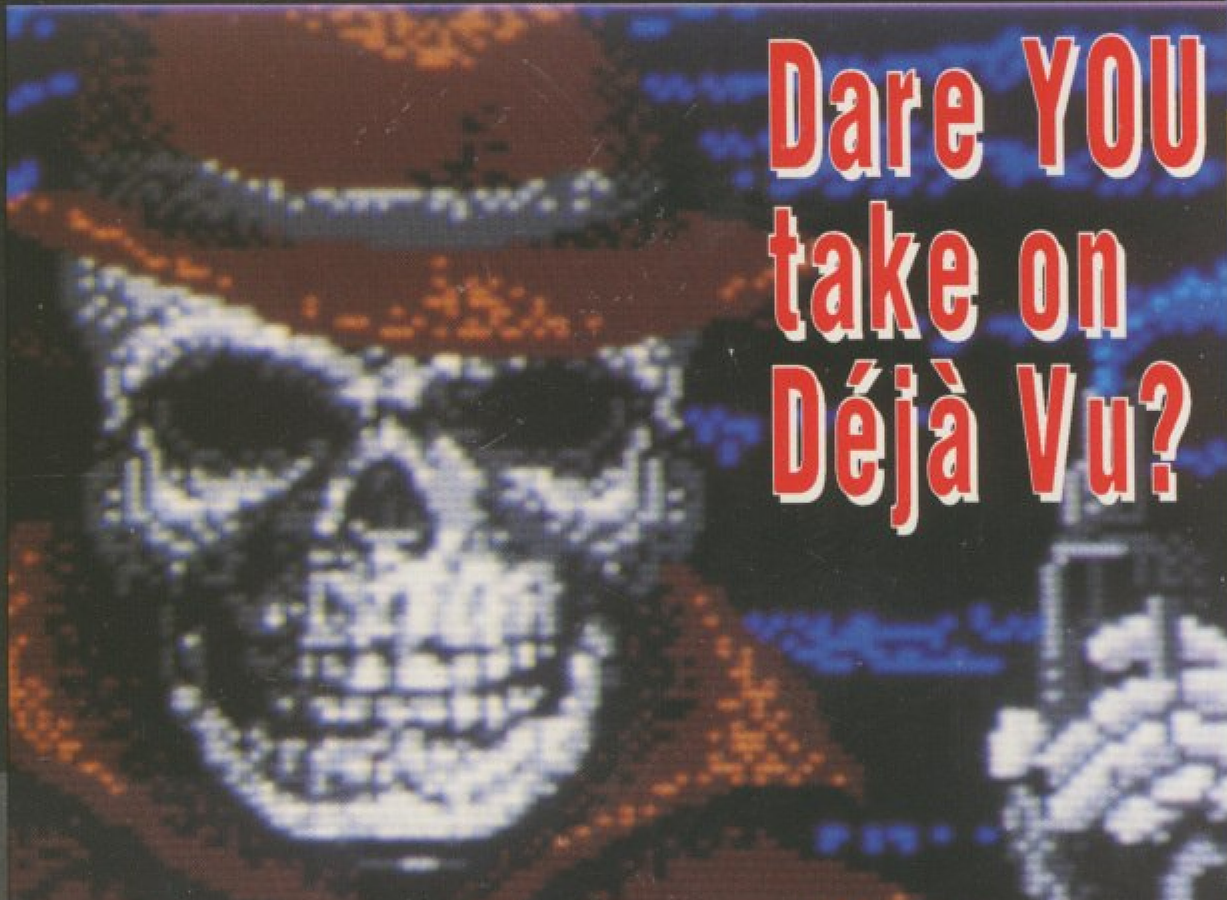
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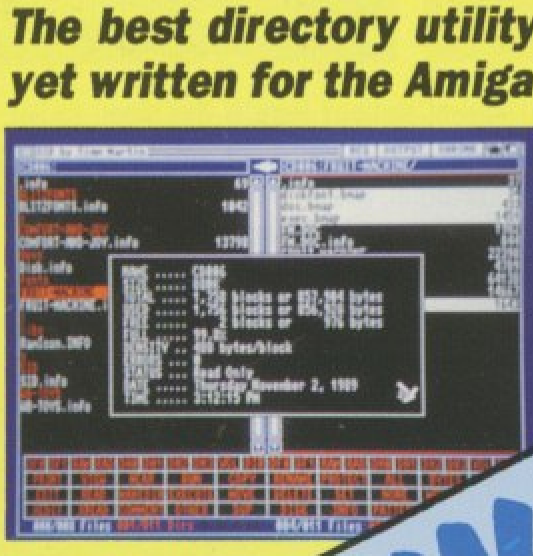
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Will you succeed in piloting the red and white rocket through space and achieve a flawless landing? Will you capture Colonel Boris, the traitor, who wants to make the expedition fail? Will you be able to find the extinguishers to put out the fires, even while floating in zero-gravity (which ins't everybody's idea of fun)? Will you succeed in finding and disarming the bombs and freeing your companions in order to get out of the rocket to make the first step on the Moon? You will discover all this by playing "TINTIN ON THE MOON", the first computer game based on the comic books by Hergé...

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** STOP PRESS **
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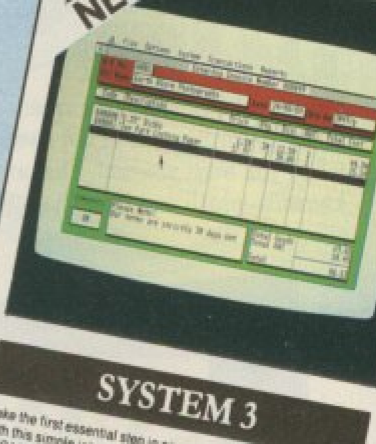
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NEW





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CASHBOOK

Use your computer as a powerful business tool and take the drudgery out of book keeping! In its simplest form, the program will replace your Cash and Petty Cash books BUT Digita's program, in effect, does much more. Typical information includes: * Summary of VAT information to enable completion of VAT Return. * Monthly summaries and departmental analyses of sales and purchases. * Total debtors and creditors, sales, and overheads. * Income and expenditure analysis. * Journal routine for entering transfers between accounts. * 199 nominal account titles, most of which are user definable. * Observes accounting procedures and meets legal requirements, assuring correct approach to book keeping. * Full audit trail and integrates with Final Accounts.

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You & Di can take to the sky



AMIGA SCENE

Education goes a bundle

DEMAND for Commodore's Class of the 90's education bundle featured in last month's *Amiga Computing* has been such that production has been more than trebled.

"Response has been so good that we had to expand the volume of the original bundle from 1,500 to 5,000", said Commodore's national sales manager for education, Peter Talbot.

This success has brought a vote of confidence from top American software house, Dr.T's Music Software, whose Midi Recording Studio was part of the bundle – the first time an American software house has worked with Commodore UK in this way.

"I think that there are a number of ways software companies can work with the hardware manufacturers to expand the marketplace", said Dr.T. boss Al Hospers.

"We will be working closely with Commodore both in Europe and the US to expand Amiga computer sales".

Dr.T's was poised to back up its confidence in the Amiga with a number of new music products to be launched at Comdex in Las Vegas.

These were a new upgrade to its keyboard controlled sequencer now including SMPTE time code, full intuition interface and a direct link with other Dr.T. applications through its multi-program environment, Phantom SMPTE synchronizer box which allows KCS or other compatible video and music software to be synchronised with an audio or video tape and AutoMix, a computer controlled mixing panel for automated volume and controller mixes of music.



Official word out now

EVER since the dawn of the Amiga, Commodore has been very good at documenting the hardware and software in a way which helps developers to get the most out of the system. Unfortunately the documentation has always lagged behind the products.

Now Commodore has caught up with the hardware. The revised and updated Amiga Hardware manual, called by the techie cognoscenti "The one with the blue cover" is out now.

It is seriously techie. There is an introductory tutorial on writing safe, upwardly-compatible software directly to control the graphics, plus detailed descriptions of the copper, blitter, playfields, and sprites as well as sounds, system control and interfacing hardware.

Even if you write dangerous code you need this book. It is the Amiga programmers bible and worth every penny of the £23.95 Addison Wesley is charging. Even if the company does have a rather liberal view on exchange rates. A good technical bookshop should have it in stock, alternatively you can order from any bookshop by quoting the ISBN number 0-201-18157-6.

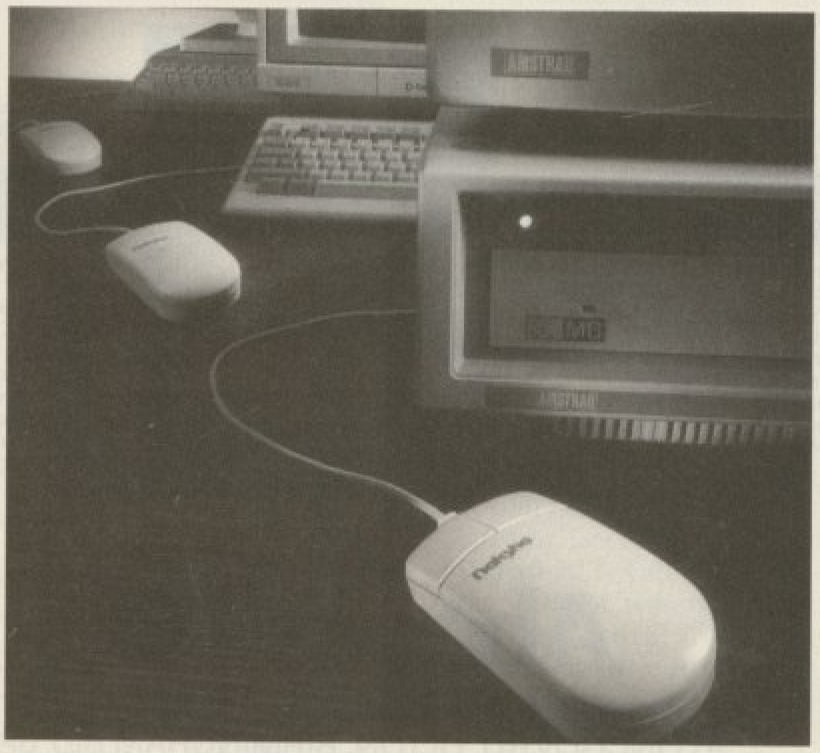
Roving rodent gets around

A UNIQUE three-in-one mouse has been launched by Naksha UK (0925 56398). It can be used with the Amiga, Atari ST and Amstrad PC. The Naksha Upgrade Mouse connects easily to all three machines.

Naksha UK is the recently founded specialist computer peripherals subsidiary of a Jersey company funded by a multi-million pound British electronics conglomerate. The three-in-one mouse is the result of a tie-up between Naksha and a high precision manufacturer in the Far East.

It is 100 per cent compatible with no additional drivers needed and comes complete with adaptors, mouse mat, mouse holder and a discount voucher for Electronic Arts software.

"Our market research has shown that there are an increasing number of end users who own more than one type of machine", said general manager Jay Savoor. "This is the perfect mouse either for the owners of one machine or a combination of the three most popular makes". The three-in-one mouse costs £39.99.



Stop thief

IF you are a software pirate you are a thief. Thieves will be prosecuted. This is the message from FAST (the Federation Against Software Theft) and ELSPA (the European Leisure Software Publishers Association).

You will see their advertisements in Amiga Computing and many local shops.

The theme of the advertising is to highlight the risk of prosecution if you are caught pirating software.

The penalties are extremely severe and include imprisonment.

Hackers will go to prison

HACKERS have taken a predictably strong stance over proposed new laws which could lead to stiff jail sentences for computer misuse. Attracting most criticism is a minor offence which could land the fun hacker with up to three months in prison.

Objectors plan to make their views known to Trade and Industry Secretary Nicholas Ridley who has invited pubic comment on the recent Law Commission report which recommends stiffer penalties for hacking. Despite this, it seems certain that the Government will bring in the new laws as soon as possible.

"The Commission are to be congratulated on an excellent report which sets out clearly the case for new legisation in certain areas", said Mr. Ridley. "I am inclined to accept the Commission's recommendations. The Government considers that legislation should be brought forward when a suitable opportunity arises.

"I should like to take into account the comments of all interested parties on the detailed proposals. We will be contacting individuals and organisations known to be interested but I also want anyone with comments to write to my department as soon as possible".

Principle objections to the Law Lords' proposals are that they are too hard on the young hacker who may break into a computer for fun then be landed with a criminal record.

Widely covered in the national press, the Law Commission report suggests three new criminal offences to combat hacking. It was thought that patching up existing criminal law would not provide adequate deterrents.

First is a basic offence of unauthorised entry into a computer system which will apply to anyone who enters another's computer either for fun or to try and interfere with it. This will be a summary offence punishable with a maximum of three months imprisonment.

Second comes a more serious offence of unauthorised entry into a computer system with intent to commit or assist in the commission of a serious crime.

The third offence is of intentionally altering computer-held data or programs. It covers the use of worms, viruses or logic bombs and will include both attacks on a particular computer and the circulation of infected discs which could alter data. This also carries a maximum five years jail.



Key to the contents

IT is nothing new but it's certainly useful. Access Keyboards (0734 663333) has introduced another solution to the problem of altering wording on special function keys.

The clear-topped replacement keys hold appropriately printed labels which can be replaced when the function of the key is changed and do away with biro scribble on scraps of sticky paper. Prices vary with quantity from £1 each for 10 to 63p each for 100.

Now even Russia's linking up

EVEN the Iron Curtain is no barrier to MicroLink. The computer-based communications service is poised to welcome its first subscriber from the USSR.

Alexander Troukhanov has applied for details from his home in Moscow and the men in the know say there is no reason why he should not be linked up.

This underlines the truly international flavour of the new service provided for MicroLink subscribers. Once an official ID is allotted, it can be used throughout the world, making MicroLink a boon for the busy traveller.

MicroLink users can take advantage of a communications network which services more than 200 metropolitan areas in America, Canada, Mexico, South America, Europe, Africa, Australia and the Asian Pacific rim. It links 20 major industrial countries with more than 175 communications processors and more than 190,000 miles of dedicated circuits and satellite links.

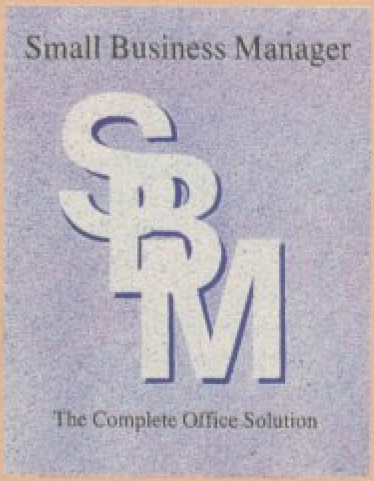
Many of the access points now provide 300/300 up to 2400/2400 baud rate plus MNP level 5 error correction and data compression. Before its move to the Istel service in October last year only three European access points were available to MicroLink. From his flat in Moscowskaja Street, Alexander Troukhanov could soon find himself with the freedom he has always dreamed of.

In a Talespin

STOP press news from Microdeal (0726 68020) is Mastersound, a low cost sampler for the Amiga with software by the same writer as A.M.A.S. More details of this £39.95 package in the February issue.

In our December review, Microdeal's Talespin program creator was not given its final score. Talespin notched up 13 out of 15 for ease of use, 10 points for speed and nine for value.

Well, it figures ...



SOMETIMES Amiga products can be like London buses. No, not because they are always crashing. You wait ages for one and then three come along at once. Up until now the Amiga has always been a bit light on accounts software. Now there are three new packages.

Cashbook Controller and Final Accounts from Digita is the cheapest of the three at £69.95. Suitable for sole traders, partnerships, limited companies, clubs and charities, it is divided into two programs.

The Cashbook Controller will look after multiple bank accounts, petty cash, nominal accounts, and VAT returns. There is comprehensive report printing providing a full audit trail.

Final Accounts takes data from Cashbook Controller and produces a trial balance, profit and loss account and a balance sheet.

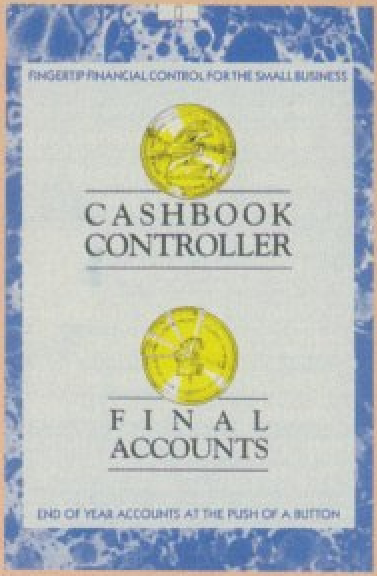
The program is supplied with free after-sales support for 60 days. The programs are available separately. For more details call Digita on 0395 270273.

Upmarket, and more expensive at £99.95, is Small Business Manager from Hi-Tension, an integrated collection of invoicing, statements, vatbook and stockbook.

The invoices package generates copy invoices, credit notes and profit and loss information.

At first glance this seems to be a more comprehensive system, although not quite as detailed in its reports. For more details contact Hi-Tension on 0252 344454.

Top of the range, with what looks like the best manual, is Arena Accounts. For £150 you get a comprehensive suite of programs which offer free format sales invoicing, flexible and comprehensive VAT reports, profit and loss, balance sheets and price lists. For more details contact Arena Technologies Ltd on 0274 280222.



Bat pack is taking off

YOU might have a tough time finding a Bat pack this month. Nearly 45 shopping days before Christmas Commodore announced that it had sold out of Amigas.

They won't all be neatly wrapped and hidden in a cupboard under the stairs. Or for our younger readers, sitting in Santa's grotto near the North Pole. Most of them will be in shops and warehouses waiting to be bought.

But when they have gone, all 100,000 of them, that will be it until the New Year. Commenting on the success of the bundles, David Pleasance, Commodore's man in charge of selling home computers. said: "At Commodore we set out to achieve a new standard in leisure computing by adding extra value and quality to the Amiga 500 and, for the first time, bundling – and launching – a major software title such as Batman simultaneously."

Combined with the light fantastic C64 pack, Commodore will sell £60 million worth of computers this Christmas, which should bode well for the next set of results. Last month Commodore International announced a loss for the second quarter in a row. It looks like Commodore UK really is the jewel in the company's crown.



Christmas presents

EXTENDING its range of Amiga 500-based kits, The Disc Company has now launched Amiga Gift Collection. It includes Phasar 3.0 Home Financial Management which keeps track of income and expenses and can produce reports on the state of household accounts.

Who!What!When!Where! is billed as the all-in-one solution for organising daily activities. It includes appointment book, scheduler, calendar, "to do" list, alarm clock and address book.

The pack also features typing tutor MasterType, arcade-style car racing game F40 Pursuit, Hole-in-One miniature golf and an Amiga compatible joystick.

Priced at £79.95, Amiga Gift Collection is available through all The Disc Company's UK distributors including Centresoft, GEM, Leisuresoft, HB Marketing and SDL.

New Amigas launched

COMMODORE has used the giant Comdex Fall show in Las Vegas to launch a 68030 based version of the Amiga. It is an upgraded A2500 called the A2500/30.

The 25MHz machine has 2Mb of memory and is aimed at the desktop publishing market. It has as standard 2Mb of memory and 1Mb of ram. The 2500/30 comes with a single 880K 3.5in drive and a 40Mb SCSI hard drive.

Resembling the A2000 externally, its internal motherboard has five Amiga expansion slots plus two PC XT slots and two AT slots. There are no plans yet for a UK launch.

Dramatic price cuts were also announced but Commodore said there are no immediate plans to bring them to the UK.

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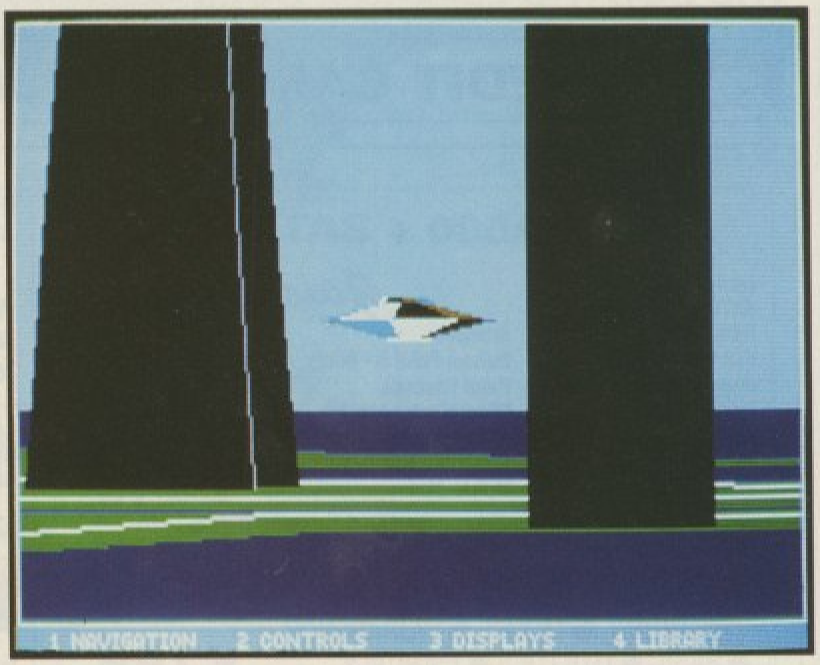
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Amiga Arcade



Deborah Israel, SubLogic marketing person and the best female Pitts pilot in Illinois



Fantasy islands

THIS is a new one on us – an adventure for a flight simulator. In fact, it's not a scenery disc for just *one* flight simulator, but for almost the complete SubLogic range – Flight Simulator II, Microsoft Flight and Jet included.

The scenery covers the 400 miles of Hawaii, the second most picturesque island chain in the world. It includes 30 or so airports, many of them with advanced features, and SubLogic claims to have improved the runways by adding FAA-spec markers.

If you think landing on a runway is for pansies, then you can try landing on the draining board. This is part of the mysterious fantasy land contained in one of the island's volcanoes. Another land is completely sideways. Sounds like Macclesfield.

The Hawaiian Odyssey scenery disc is out now. Further away from SubLogic is UFO, another flight simulator, but one that takes a step beyond reality.

This little baby has an anti-grav propulsion system with an anti-laminar transducer with which to adjust your atmospheric drag. A graviton tractor beam is available for those ever-so dodgy manoeuvres. And if you don't want those nasty humans to see you, a quick flick of the translucer switch will make you invisible at low levels.

But wait, there's something wrong... No guns. Not even a Dan Dare water pistol. It seems your mission in life is to buzz humans, not blast them. Bah!

UFO's "experimental graphics" are being converted to the Amiga right now, and when they're ready the game will be compatible with all the SubLogic scenery discs, including the above-mentioned Hawaiian Odyssey.



Flight Hawaii-Five-O, you are cleared to land on worktop three

All the latest news on the games software scene

Suzar is back!

COMING from Imageworks this winter is The Final Battle, the long awaited follow-up to Legend of the Sword.

Legend saw the hero locate and take the fabled sword and shield with magical powers from the evil wizard Suzar. Now Suzar has been captured and imprisoned in a tiny teardrop.

As the action opens in The Final Battle, you, playing the hero, are set upon by a dozen humanoids and locked in an underground cell. Meanwhile Suzar escapes from the teardrop, taking the sword and the shield with him to the castle of Anar.

Your quest, should you decide to accept it, is thoroughly obvious.

The Final Battle will contain some new features, including a unique weather system which covers all climatic changes, influencing the action accordingly. Superior graphics are promised – 3D views of every location – along with a larger inventory and vocabulary than its predecessor. Out for Christmas £19.99.



If you think I'm going to climb into that bucket and wind myself down that well...

Have you got the bottle?

ALONE in her lab one night Dr Slimms little expected a miniaturised group of crack commandos to burst out of a terrarium and kidnap her.

For some reason known best to the maniacal midgets, they miniaturise her and take her back to the fortress they have built in the little bottle garden. How they managed to write the ransom note is not explained.

With a fiendish plot of this magnitude there can only be one man for the job. Unfortunately Percy Thrower is unavailable.

But never fear, Captain Frontier is here. Sizing up the situation, he decides to launch a small scale operation by being cut down to size himself and following the bad guys into the terrarium.

Guide the captain through this arcade style adventure which will contain, says Imageworks PR person Cathy Campos, "action sequences, clues to be found and mysteries to be solved".

Watch out for the coming review to see if Cathy's right or if she's been growing more than adventures in her bottle garden.



Hello? Is that Gardener's Question Time?

REVIEWED THIS MONTH

95% Interphase
94% Rock'n' Roll
92% APB
88% Power Drift
85% Deja Vu II
84% Shogun
81% Swords of Twilight
80% Xenomorph
77% Quest for the Time Bird
72% Star Command
68% Fire Brigade
68% TinTin on the Moon
57% Daily Double
53% Shinobi

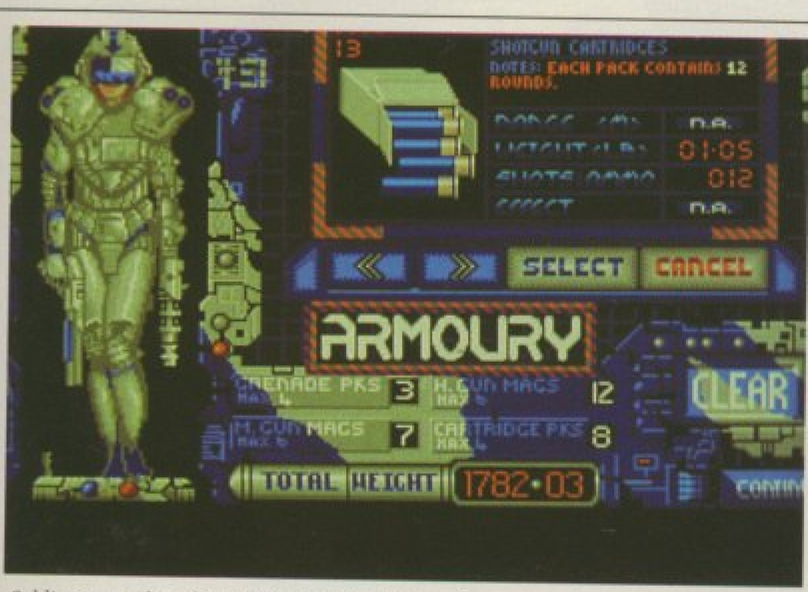
MAX HACKS

- **Batman – The Movie**
- **FOFT**
- **Kick Off**
- **Raider**

Gallup Chart

		Last Month
1	Xenon 2 Imageworks	NE
10	Ocean £24.99	1

Sorry, due to a fire at Gallup HQ, there is no software chart this month. Normal service will be resumed as soon as possible. Um, at a guess we'd say that Xenon II is still number one, hotly pursued by, um, about nine others



Soldier 2000, "kitted out with everything the modern hi-tech combat of the future can carry", it says here

Any time, any place, any war

ARTRONIC is in the final throes of converting Soldier 2000, its scrolling strategy beat-'em-up, on to the Amiga.

The game features five scenarios, multiple weapons, parallax scrolling plus both 2D and 3D play fields.

And as if the blast and kill, total wipe-out, war scenario isn't enough to attract the thousands of young, red-blooded adolescents who read this magazine – well, look at the pictures at least. In Soldier 2000 you get to play the sexy, metal clad girlie with large wossnames and two or three other things that probably go Wahay! in the night.

Sheesh! Who dreams up these plots? Young, red-blooded adolescents of course.

Trade secrets



Blast the planetoid pirates

VAUX is the first release from Hurikan, the newest of the Paris software houses.

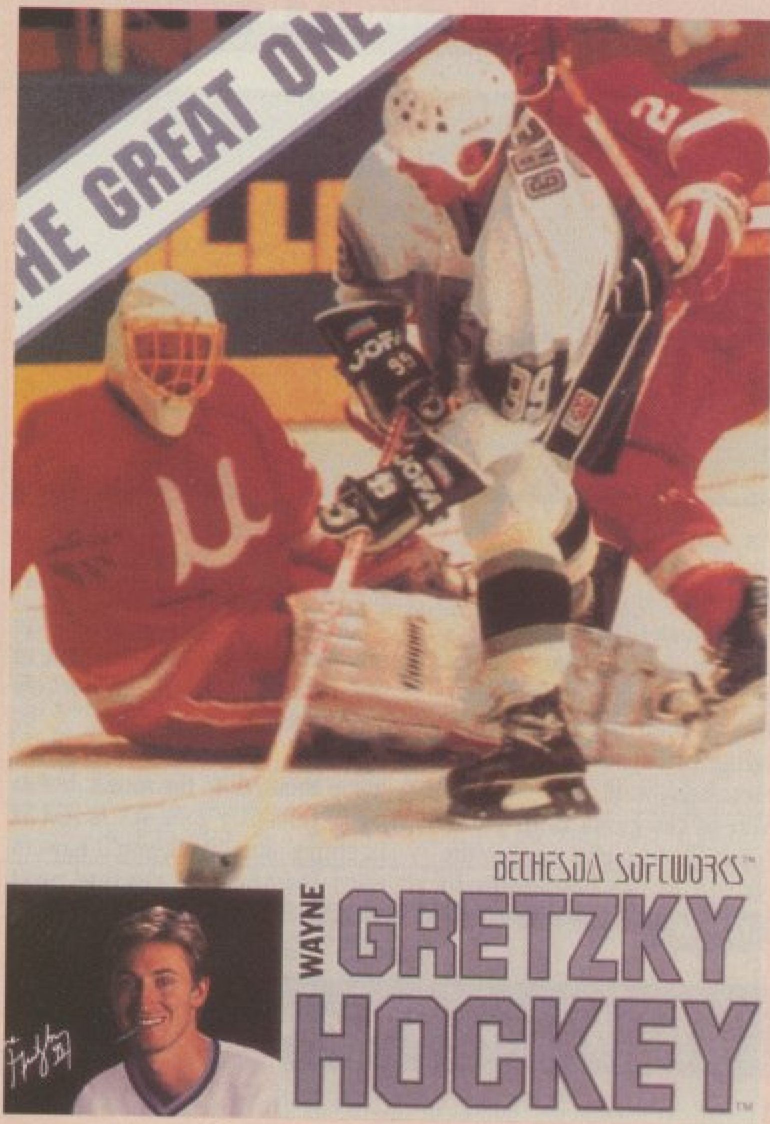
As a black market racketeer you battle your way from a planetoid through multi-way scrolling screenfuls of pirates, other traders and members of the local constabulary in order to reach the trading posts, where lots of shady deals are done.

The other traders and police are programmed with intelligence, a fact we feel is at odds with the claim that Vaux has a real life feel.

The aim of the game is to amass enough wealth so that you can buy the whole of the trading system.

"The carrying of cargoes requires thought," says Hurikan person Mungo Amyatt-Leir, "for instance, you should not mix radioactive fuel with fresh food or livestock".

Why not, we ask? The government is all for it.



COMPETITION

Get into gear with Gretzky

HERE'S your chance to win sports gear worth an incredible £250. Wayne Gretzky and Bethesda Softworks, in conjunction with Active Sales and Marketing, have clubbed together to provide as a prize an authentic Los Angeles Kings' ice hockey outfit, comprising shirt, shorts, gloves and leggings.

All you have to do to win is tell us how many minutes there are in an ice hockey period.

Send your answers on a postcard or stuck down envelope to: *Wayne Gretzky's 20 minutes a period Ice Hockey competition, Amiga Computing, North House, 78-84 Ongar Road, Brentwood, Essex, CM15 9BG.* To reach us Jan 2 latest.

Will it or won't it



Aha! A bit of Fireblade. And a flask of, um, stuff

SWITCHBLADE has got the powers that be at Gremlin Graphics scratching their heads. None of them is sure whether they've got a classic on their hands or just an irritating little arcade adventure that won't go away.

Aim of the game is to guide Hiro, the Bladeknight, through the labyrinth of the Undercity to recover the 16 fragments of the shattered Fireblade.

Once you have collected all the bits you must use said Fireblade to dispatch Havok, the guy who's been terrorising your people.

Graphics are nothing to write home about, ditto the sound. But as far as gameplay goes, it's as fast as lightning and... Well, you'll have to wait for the full review next month.



The Stun Runner coin-op displays its polygon generated 3D graphics

MJ T-shirt winners

WE had an enormous amount of correct answers to MJ's Moonwalker competition. Wonder why? One person got it wrong. We're sending *him* a new brain. Anyway, the lucky winners are (takes a big breath):

Eyal Teler from Jerusalem, **G Wade** from BFPO 45, **Matthew and David King** from Bedfont, **Andrew Slimmon** from Wolverhampton, **Clare Pemberton** from Peterborough, **Sally Smith** from Orpington, **Steve Martinez** from Fulham, **Sheraz Yousaf** from Hampton, **Emma Bradford** from Carshalton, **Janine B-Johnson** from Mitcham, **Andrew and Kenneth Chan** from Willesden Green, **Daniel Brown** from Chiswick, **C Caple** from Newquay, **Simon Putman** from Woking, **Glenn Durant** from Canvey Island, **C G Bennett** from Sheffield, **M Bradwell** from Manchester, **Paul Jones** from Biddulph, **Nicholas Holmes** from Epson, **Nabeed Ramzan** from Dunblaney and, lastly, **David Fairweather** from Blackburn.

Well done all of you, except Emma Bradford who was very naughty and sent in two entries. She only wins a prize because she sent in a scented envelope which got rid of the smell of the editor's awful after shave. Goodies on their way.

Set you racer to stun

IMAGINE a cross between Powerdrome and Road Blasters. Racing through closed tunnels, open roads and over ramps in a sports spaceship. Stun Runner, the Atari coin-op, uses all the graphic 3D power of Hard Drivin' in a glide through the future.

Now that everyone has proved they can do solid graphics, Stun Runner uses vectors in the high speed mode to make it look as though your craft is whizzing along when you hit one of the Hot Spots.

There are tricks to mastering the curves, a bit like a Thirtie's Brooklands racer. Only Blown Bentleys didn't have advanced lasers, shock waves for smart bombs and add-on armour. Tutorial modes and lots of maps make controlling the 900 mph thingy easier, but mastering the game, with loads of tracks, is gonna take a while.

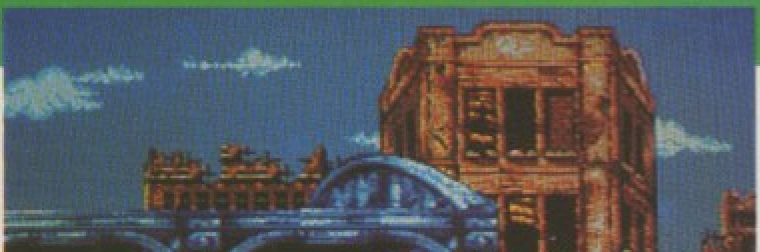
And you will have to wait a while before you can play it. The coin-op is only just finding its way into the arcades, with the Amiga version, converted by Domark, to follow late in 1990.

ADVENTURERS who find themselves up the creek without an oops can now get rescued by Guiding Light, a new adventure helpline based in Manchester.

We've used it a couple of times ourselves – anonymously, of course – and have been impressed by the level of help given for adventures which haven't long been released.

You can get pointed in the right direction by phoning 0898 338933. But watch out if you get put in a queue because it's costing you 25p per minute cheap rate, 38p per minute at all other times.

Coming up for air



FOLLOWING the disaster of Navy Moves, Dinamic is set to bounce back with After The War, yet another sideways scrolling beat-'em-up.

The rolling demo we've seen looks good. The graphics and animation are superb. There's excellent attention to detail, right down to empty shells being ejected from your Rambo-style assault gun. It also looks very difficult. Let's hope it's not as impossible as its subterranean predecessor..

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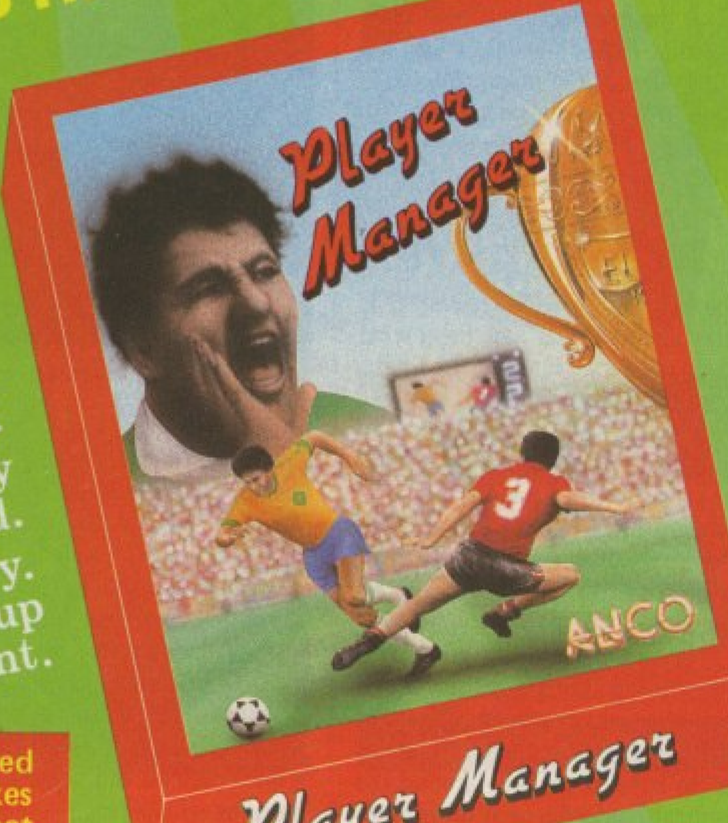
VISA

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AMIGA - ATARI ST £19.95

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PLAYING SKILLS OF THE MANAGER

This part of the game is a refined version of the KICK OFF, retaining it's pace, flavour and the universally acclaimed game play. Play in your position or control the nearest player. The first option combined with a tailor made tactics can play havoc in the opposition goal mouth.

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Devising winning tactics, acquiring players with right skills from the Transfer market and selecting a well balanced team is the test of his Managerial skills. When to hang his boots up is the toughest decision he has to make.

TACTICS

Four well proven tactics are provided to suit most situations but you can design your own tactics. See the tactics in action using the Ray Trace facility.

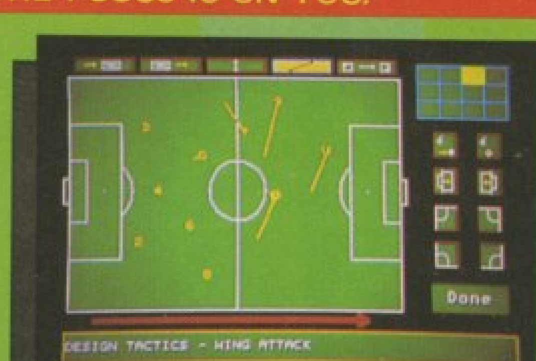
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INTERPHASE

Blow the mind

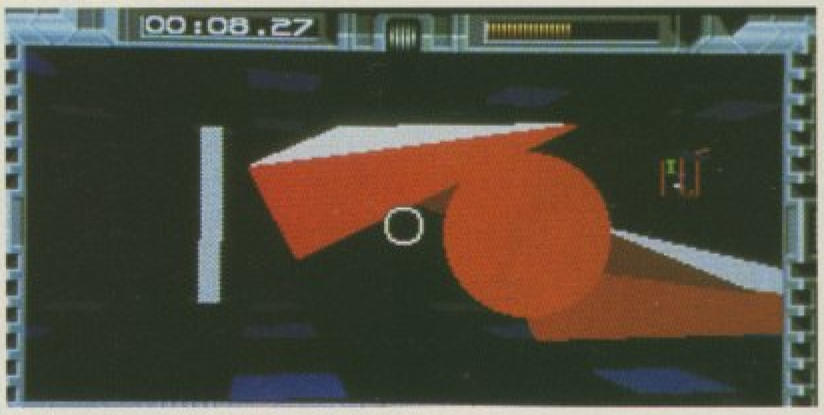
HONESTLY! I haven't heard such a ridiculous plot since the first episode of Jamie and his Magic Torch. CD dream machines used to brainwash the youth of the western world? Subliminal politics? They've been reading the Sport again.

Hmmm... does bear thinking about though. Next time you're on the train and the person opposite is playing a Walkman, ask them what their political affiliation is. I bet I know what they'll say. Absolutely nothing.

Back in plotsville, some terribly clever former employee has worked his way into the mind of the machine, seemingly by way of plugging his CD player in the wrong way round.

Having tricked his girlfriend into doing the dangerous bit of breaking into the head office and braving the killer robots, all he has to do is think his way around the central computer and deactivate circuits to ease her progress.

This would all seem a lot more plausible if it weren't for the fact that the digitised piccies at the start didn't look less like someone about to wrest technology's sword from the hands of the warlords and



Fast graphics and decent mouse control

more like a bloke donning his helmet before getting on his Vespa. Anyway, I know the plot to Max Headroom when I see it.

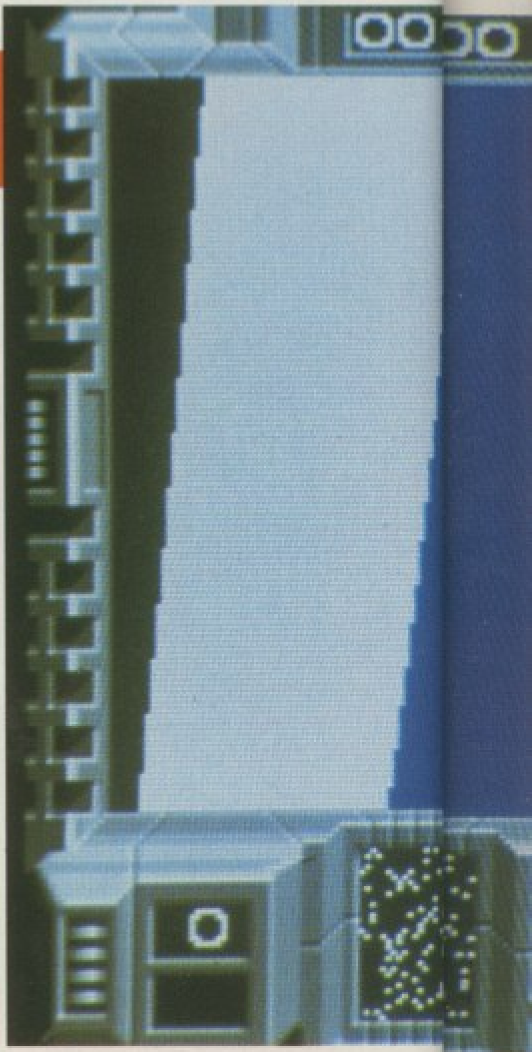
Access to the realm of the Interphase is via a tunnel or data-channel or whatever the plotsters are likely to have called it. This involves flying Powerdrome style down a chequered tunnel avoiding a few obstacles and negotiating the hairpins.

Any collision will cost energy, of which you have precious little and which can only be regained by docking with the sparse generators inside the machine.

Once you have gained access you will find yourself inside the 3D world of the Dreamtrack CPU – welcome to the machine. Various analogues of real world hi-tech components litter the field of vision – big expensive things, things that go beep, Newton Cradles and unicycling frogs. I'm sure someone with honours in psychology can make something horrible out of that lot.

Unfortunately for those of you who think with their auto-fire switches, some of these components must remain in place to ensure the success of your mission. Bah!

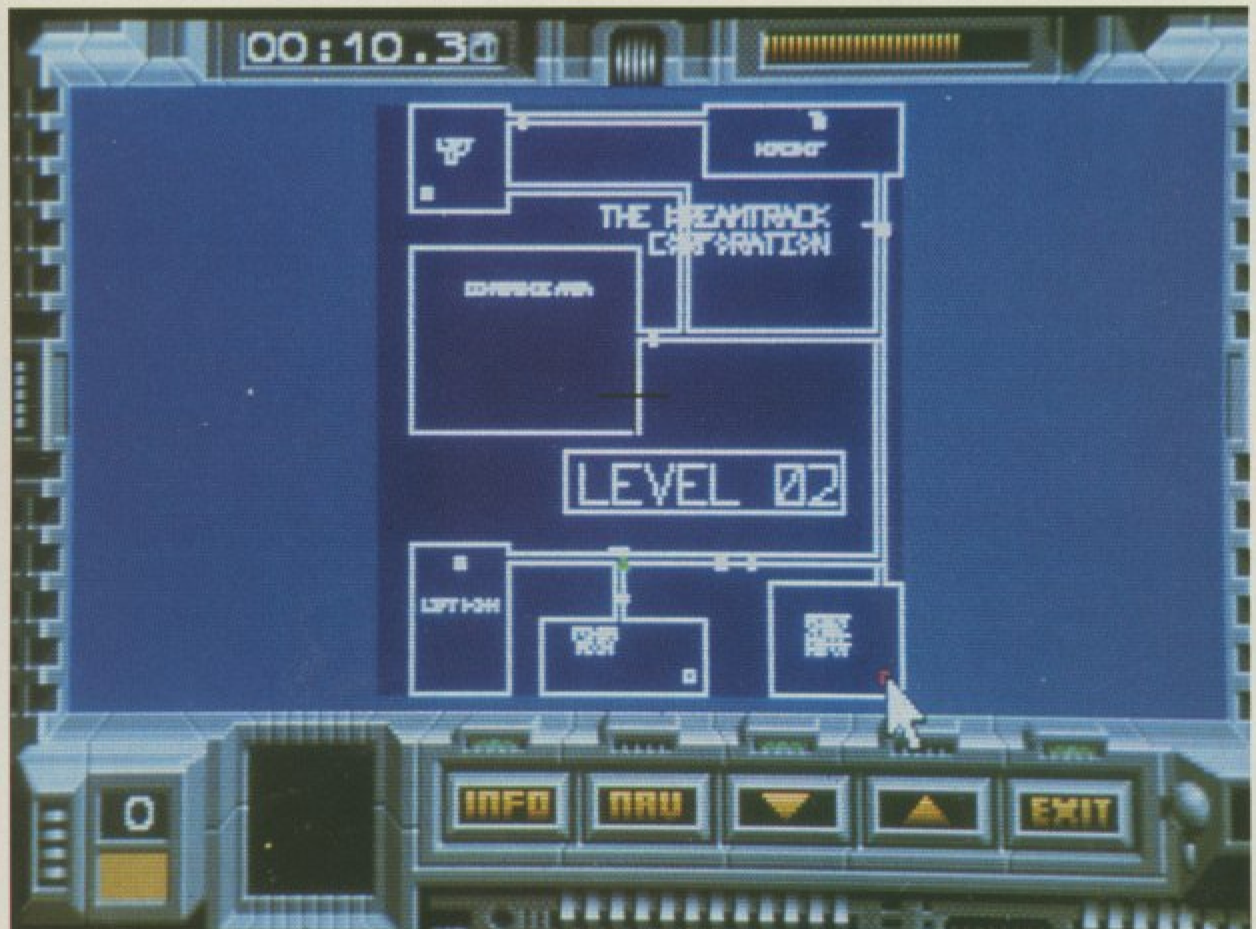
You may also find that you can't destroy all of the objects with gunfire but need to use missiles, which are a bit more complicated. Mental



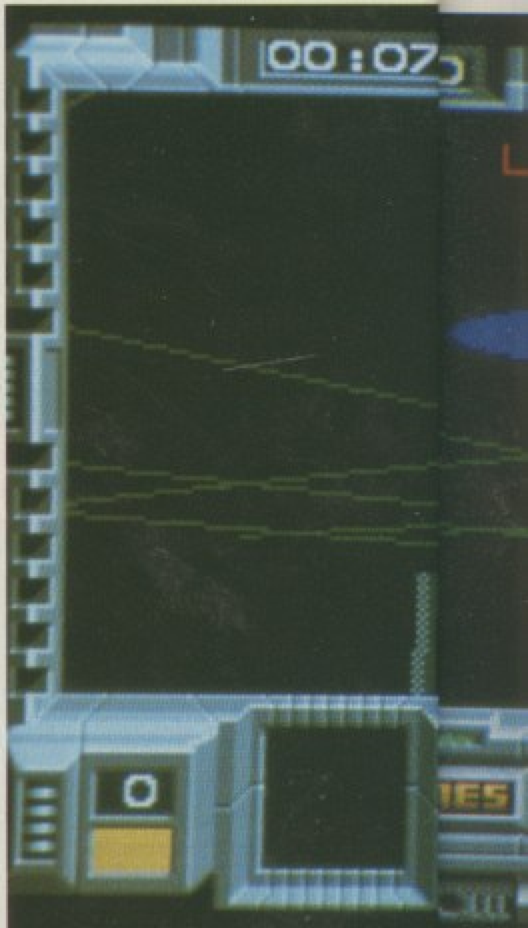
missiles? Where will it all end?

The immediate threat to the dear sweet girlie is the squad of killer robots positioned at various points around the despotic Dreamtrack Corp HQ.

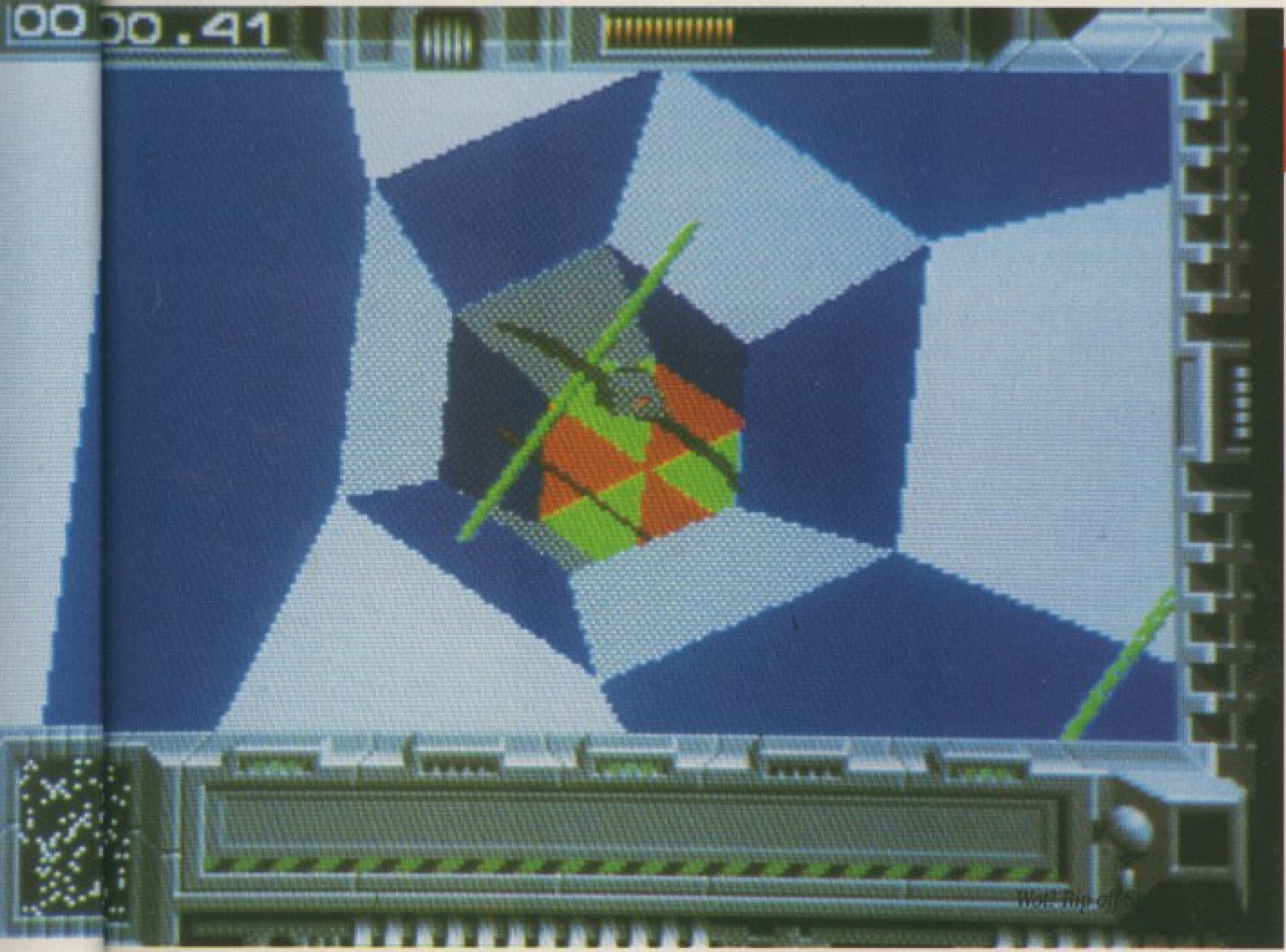
Curiously these cannot be directly controlled from the main



Map has shades of Carrier Command



Smart ellipses . . . Look for the bug.



Wol! Rip off

Interphase
£24.99
Image Works

Sound	
Graphics	
Gameplay	
Value	

Overall – 95%

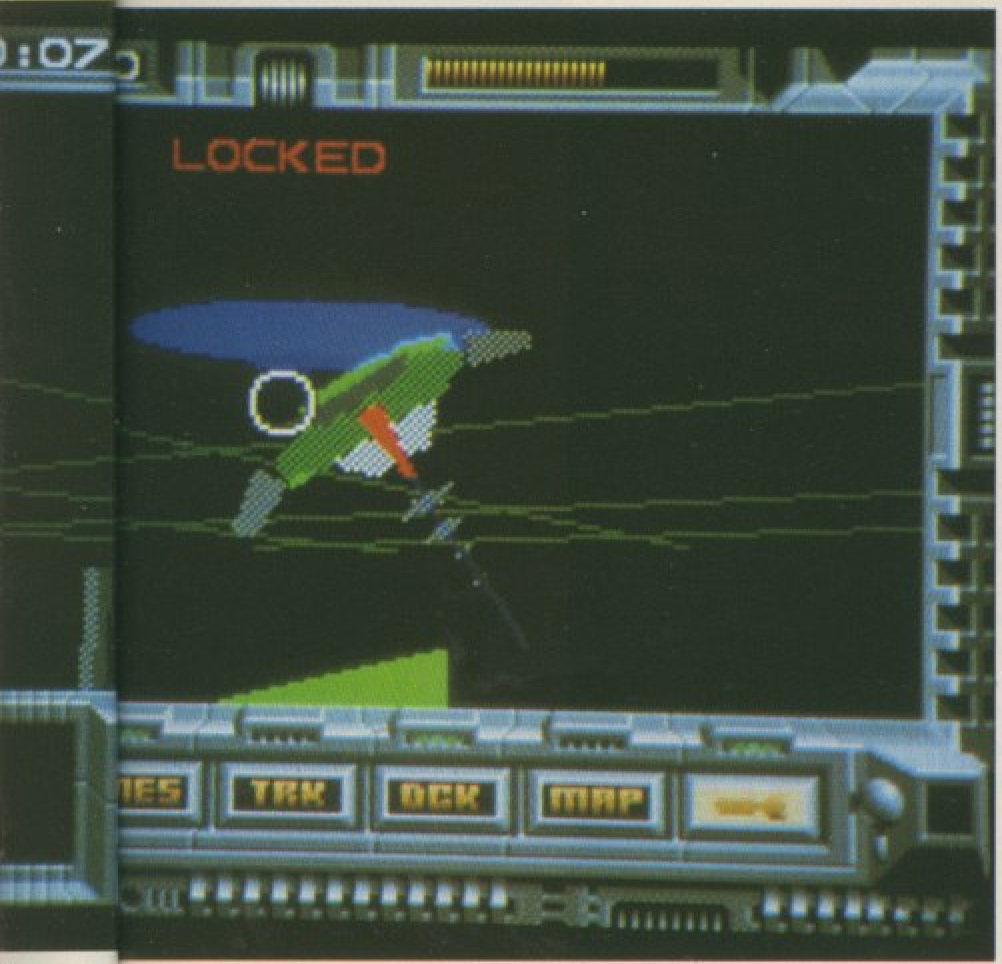
computer, and hence by you, but only influenced slightly by tampering with the security devices and sending them off in the wrong direction.

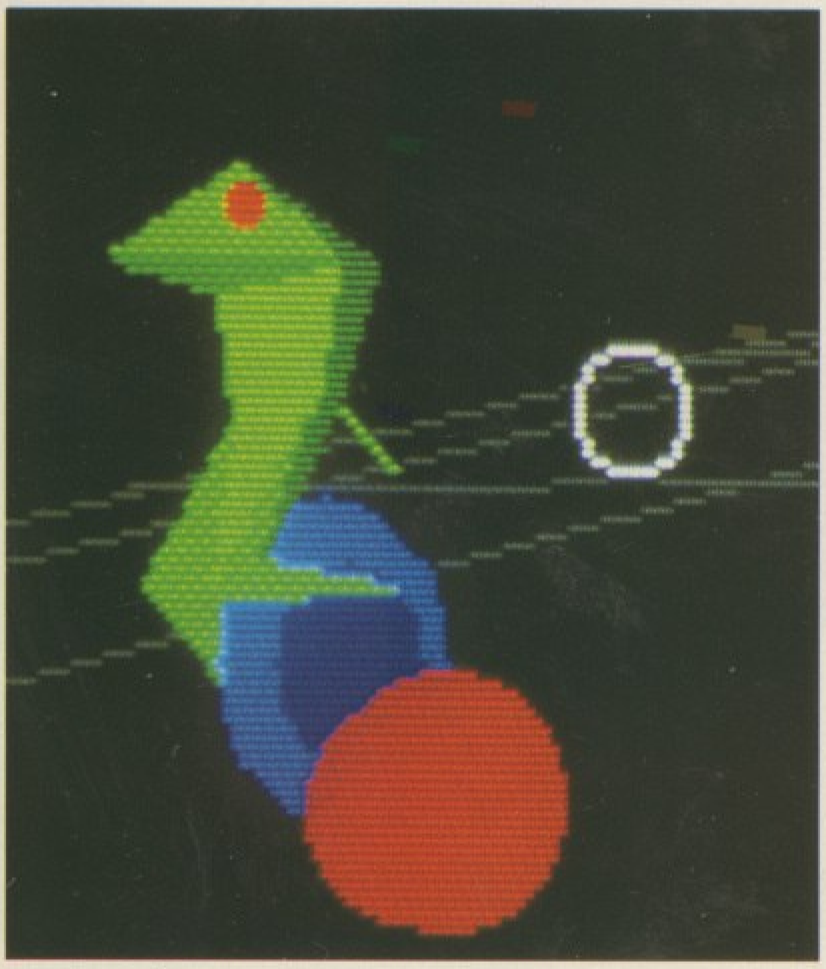
Blueprints of the levels are freely available when you get to each of the levels. These are vital for planning your strategy and for following the wench's progress. Information can be called up for any of the features marked and their position in your three-dimensional terrain can be determined using the navcom device.

Using a degree of cunning and a modicum of mad blast-crazy frantic death and disintegration, it isn't that hard to progress through successive levels of graphical excellence and effective, if not imaginative, sonic stimulation. The real threat to life is careless driving, or thinking, between levels.

Fast graphics and decent mouse control give a level of gameplay you can easily be enthusiastic over. Although the originality of the plot may be questioned, it has certainly been well implemented in an excellent piece of software.

Green





Frogs go unicycling

XENOMORPH

In space you are on the menu

SO there you are, minding your own business, reading a copy of Intergalactic Playbeing, when a pod down in the cargo bay of your ship, the Mombassa Oak, breaks loose. Urk, wholesale damage. Total trashing of computer systems.

You manage to get the Oak to limp on to the mining colony, its original destination, and gratefully set down, expecting worried faces and a Sirius Slopshocker in the bar afterwards.

Hang on though, it's strangely quiet. Where is everyone? What's all this slimey stuff? What are these cocoons? And why is there a small alien scuttling down the corridor towards me? Oh no, it can't be...

But it is. And if you were too frightened to sit through Alien(s) then you better steer well clear of Xenomorph 'cos there's gonna be loads of little scuttly things and big chomping nasty beasties pouring down the corridors of the ship and the mining station, all heading for you.

Yes, that's where the staff of the mining station on Atargatis have gone – into the stomachs of the aliens, and so will you if you don't find the equipment necessary to repair the ship and take off again.

Before you do that, you better figure out whether you're going to be Sigourney Weaver or Michael Biehn by generating your vital statistics. Sex, hair, or lack of it, and even eye colour can be defined.

Having decided who you are, whether you like boys or girls or aliens, you make straight for the weapons shop to tool up for the shoot out at the Mombassa Corral.

Stun guns and lasers, rifles and rocket launchers, grenades and mines, machine guns and even particle accelerators can be wielded wildly or stored in a 3D back pack, which is the strangest way to represent something so humble as a back pack.

Some weapons need power blocks, so make sure you store some of those as well, otherwise you'll end up using that particle accelerator as a club.

Possibly the most exciting weapon is the robo-mine, which lives to destroy. As soon as you set it off it chases after the nearest victim. Unfortunately this could be you if you don't get out of the way very quickly.

It's best used when there's a troop of Xenomorphs chasing you down a corridor and you're low on battery power. Quickly set it off, and run like hell as the sound of disintegrating aliens makes your kind of music.

While examing the contents of your goody bag, a smaller version of the main screen, which you have now obscured of course, pops up on the left side of the screen so that you can still have one eye on what's happening around you. Vigilance is everything in this game.

Once tooled up, off you set around the five level ship and the 20 level mining base. The viewpoint is 3D, but it doesn't scroll towards you, it is redrawn. It scrolls when you swivel around to look sideways though, which makes life a damn sight easier.



Don't know what it is, but it looks disgusting

The ship is all hues of metallic grey, but there are these access tunnels lined with pipes running through everything, and it's down these that the sense of fear is amplified.

Just what is awaiting around the bend in the tunnel? It's a pity this isn't a two-player game, then you could get a "friend" to go first.

Because of this threat it is essential to find the motion detector as soon as possible otherwise you never know what you'll meet in the dark.

The aliens mutate, of course. Remember the pods from Alien? Remember John Hurt leaning over one as it opened? Urk! Those pods are here and you can see them split open to disgorge small larvae, or proto-morphs. These don't hang around waiting for you to fry them – them scuttle off at a great rate of knots, looking for somewhere nice and warm to form cocoons.

Out of these the fully grown aliens slobber.

Then they come looking for you.

Duncan Evans

Xenomorph
£24.99
Interceptor

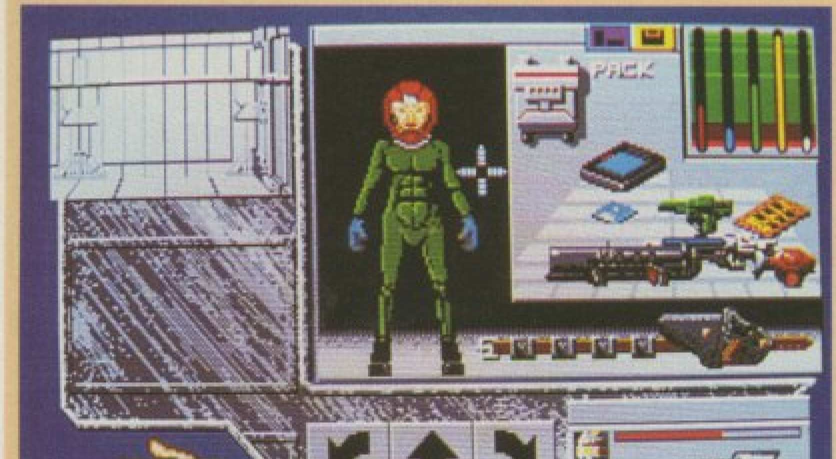
Sound

Graphics

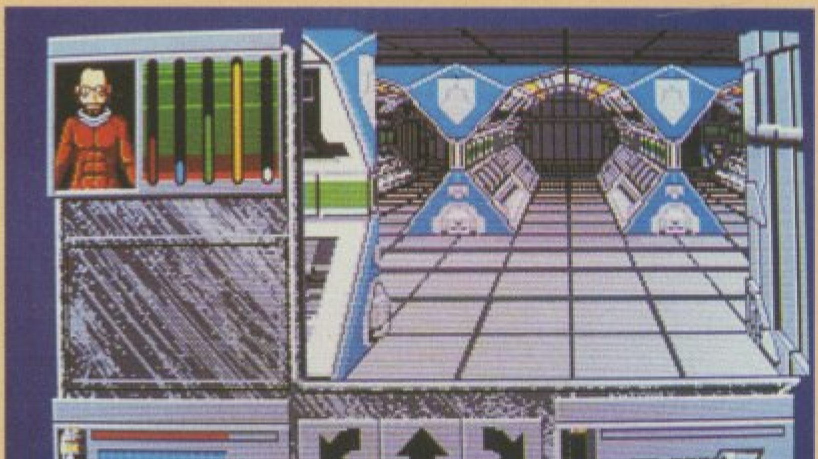
Gameplay

Value

Overall – 80%



Which way to wines and spirits?



Oh no. Which way now?

DEJA VU

Um... about half past three

THINGS were looking bad. The editor was on to me and it wasn't to wish me happy birthday. The review I'd been assigned had been dragging on for days. Deadlines weren't getting any longer. I had to do something, and do it fast, or it was curtains for me. I don't know if you've ever been in fabric retail, but it isn't a pretty sight.

Tracking the software down wasn't hard – Icom Design had set it up. Software houses were like that, you could never trust 'em, always on to some scam or other, and nearly everyone on the take. It was getting so a guy couldn't make a decent living.

I took a look at the box and got that weird feeling – you know, when you think you've seen it all before. I told it: "Of all the in- trays in all the offices, you had to fall into mine". I guess I felt kinda dumb just talking at it, so I slid it into my disc drive.

"Play it, Sam," I said.

Sam was my Amiga, I'd known him since he was very young. We were like brothers. We had our ups and downs like any other partnership, but on the whole we got along swell. He was a good kid.

Sam was doing the driving so I sat back and lit up. I told myself to be sure and get round to fixing that power cable some time. Sam stopped at the lights. We were there.

OK, so I'd been wrong about this set up. Something was different here and it made me uneasy. There was always someone trying to work a new angle, and it always ended up messy.

Hey, what kind of a stunt were these boys trying to pull? This looked a little like a Workbench screen. There was windows all over the place: Inventory, graphics, exits, text – it was all there. Someone was cracking funnies, but I wasn't laughing.

I pulled over a window and he came easy. I was surprised. I told him I was going to have to rearrange his features. He didn't look too worried. I re-sized him, sent him to the back and to the front, then dragged him around for a bit. He was unruffled. I was surprised.

I gave the same treatment to the rest of them, all except the graphic which looked too big for me to handle. They lapped it up. This was impressive.

Being an ace at this sort of work I soon discovered that I could pick up objects by clicking on them and dragging them to the inventory window. And if I opened up an object, its own little window appeared.

To move around I could either click the appropriate part of the screen or on the little squares in the exits window. Any other actions could be performed by clicking on the words in the top right corner. If this is what's meant by user friendly, fully icon-driven interactive adventures, then lay some more on me.

I soon had the full story. I was playing the part of Ace Harding, down and out in Las Vegas and on the receiving end of some unwelcome attention from the mob.

I had to get back to Chicago to try and sort it all out. But it's more than 106 miles to Chicago, I haven't got a car, never mind any gas, I'm out of cigarettes, it's light outside and I've mislaid my sunglasses.

This was going to be no picnic. It couldn't even be comfortably described as a peanut butter sandwich. But I had to complete it. I knew if I didn't I'd regret it – maybe not today, maybe not tomorrow, but soon, and for the rest of my life.

And so will you.

Green



The contents of your pockets



If you try to shirk your responsibilities you'll get a visit from this guy



So does Format, but some people will read anything

Deja Vu II
£24.99
Icon Design

Sound
Graphics
Gameplay
Value

Overall – 84%

ROCK 'N' ROLL

Awopbopaloobopalopbamboom

LIKE an epidemic that resurfaces at irregular intervals, the ball season is upon us again. You know the sort of thing – small ball versus holes, ramps and various ball-breaking devices in a quest to get to the other side.

Funny thing about this one is that it has a fairly original title. Rainbow Arts must've lost its marbles.

Anyways, the lowdown on the situation is this. You must guide your ball past various obstacles and explore each of the 32 levels. The levels are divided up into seven continents, each with its own signature tune and particular terrain characteristics.

Graphically amazing, a lot of thought has gone into the backgrounds and the various features to enable them to be highly detailed and visually entertaining and yet prevent them from becoming confusing.

The path to enlightenment is not easy, for it is strewn with many hazards and temptations. In some places the way is not only eightfold, but is twisting the concepts of euclidian geometry.

Waiting for someone or something to show you the way won't do much good. But you can always look at the map, where detail will be revealed to a depth indicated by the number of eyes you have picked up.

Consequently, on the first two levels you will find as much useful information on it as on the back of a packet of Crunchy Nut Cornflakes.

The problems are mostly logical – you come across a hole in your path so you have to fill it in. Or there is a colour-coded lock so you need the corresponding key.

Some problems are a little more obscure. You discover an unpleasant acid bath in your way and there doesn't seem to be any other route. It's probably something to do with one of those mysterious levers that are hanging around.

Further doubt is cast on the *raison d'etre* of the eggs that appear occasionally. Rolling over them smashes them, but aside from that it appears to have no other effect. Perhaps you're just an Edwina fan.

There are not eight million ways to die, merely three. You can run out of energy by being hit by explosions or energy barriers and the like, you can run out of time on certain levels or you can just fall off the world. Not everything is out to get you – magnets, fans and arrows just want to tell you were to go.

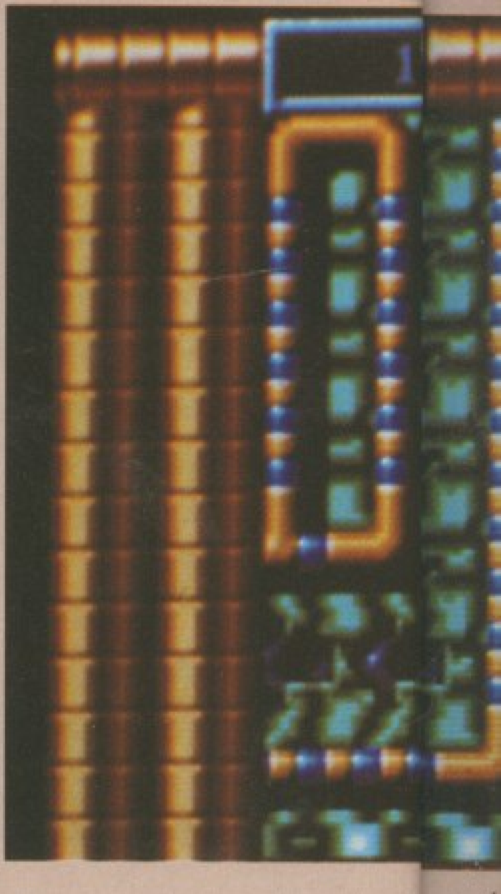
It is a bad idea to get into the habit of doing the obvious. After racing through scores of electric barriers you will find that every time you see one you will have a



Timothy Leary's dead. No, no-no-no, he's outside looking in...



Gonna grab that cash with both hands and make a stash...



Pavlovian urge to dash through it. (For further reference look out for the Little Green Man theory in my forthcoming paper on the psychological aspects of crossing the road.) Often as not there is a way round it if you are cunning.

The only thing which quells my rampant enthusiasm for Rock 'n' Roll is the apparent lack of a save option. When you've made it to level six it would be nice to be able to start off from there. Perhaps this is a move to increase the durability of the game, something I feel is not necessary because there are always things to explore.

Mouse control is excellent. As soon as I got over the initial frantic paddling stage I found that pixel perfection was possible. The way the ball animates with spots going around helps the feeling of motion, and hence the ease of control.

Sound is not quite what you may have expected from the title but is nevertheless pleasing and plentiful. Worth hooking up to the hi-fi.

Rock 'n' Roll is the best of this genre so far, possibly due to its greater dependance on brain power than mouse power. One thing is confusing me though – where are the sex and drugs?

Green

Amiga Computing Excellence

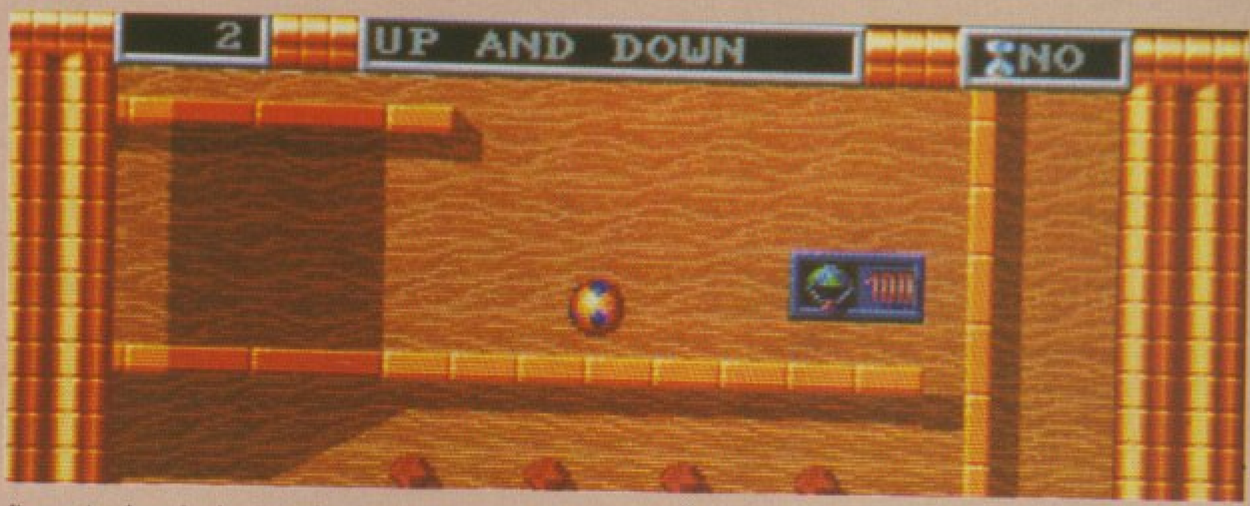
Rock 'n' Roll
£19.99
Rainbow Arts

Sound	
Graphics	
Gameplay	
Value	

Overall – 94%



Well my heart went zoom when I crossed that room..



I'm coming down fast but I'm miles above you...



Many times I've been alone and many times I've cried...

TINTIN ON THE MOON

Blistering barnacles!

HERGE's Adventures of TinTin! used to a familiar cry on children's television long before the current invasion of Japanese transforming catpeople he-man cartoons which profiliate today.

That plucky lad with the strange haircut, and shorts so outlandish that they are bound to be fashionable, had numerous adventurous goings-on with his faithful dog Snowy and other erstwhile companions.

And now, betraying his cross channel origins, that equally French software house Infogrames brings us TinTin on the Moon, a game loosely based on one of his televised epics.

No matter what you might think about French software, it is fair to assume that more than average effort has been lavished on the graphics. TinTin sur la Lune is no exception.

The opening sequence is superb, using animation and sound effects which honestly give the original TV cartoons a run for their money.

It starts with a minimilist French countdown, after which the re- decorated V2 rocket – designed by Professor Calculus and piloted by TinTin and friends – blasts off amid a blaze of pixels and some 2001- type music. The Thompson Twins appear to be absent from the crew list; they must have been at a recording session that day.

The game consists of two stages, each played five times as the ship progresses on its journey to the moon. The first stage is a three-dimensional view of the rocket hurtling through space, dodging asteroids and collecting spheres of energy.

The energy level is important because allowing it to reach zero will end the game. This stage is easiest to play with the mouse.

The second stage, which is where the real game takes place, is a platform and ladders affair. If you used the mouse for the first stage, you must quickly look around the desk and find a joystick. It's either that or the keyboard, and *nobody* uses the keyboard these days.

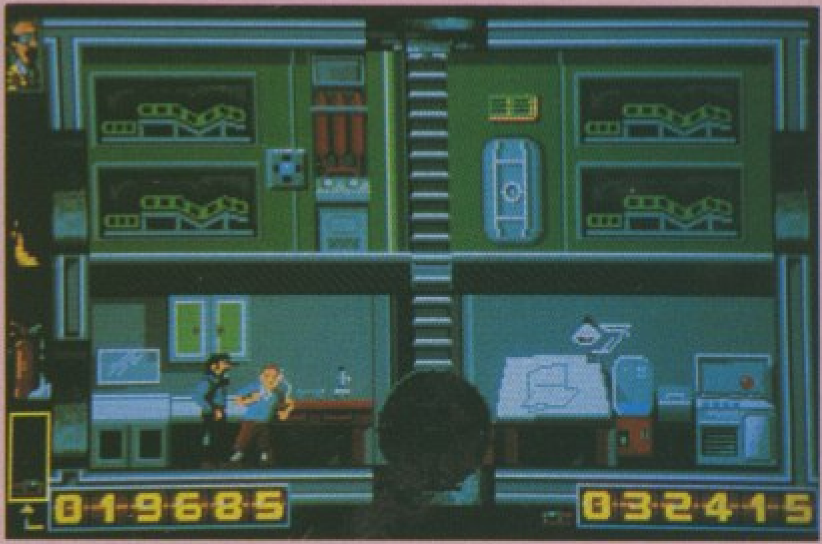
The dastardly, anarchical and suicidal Colonel Boris has planted some bombs around the various cabins. As if this wasn't enough, he has started fires left, right and centre while he was at it.

TinTin rushes about the ship in a sort of breakdancing frenzy, defusing the bombs and extinguishing the fires before the ship explodes with suitably terminal consequences.

Snowy is as helpful as always, wagging his tail and going woof. Or is it bark? No matter, the dog is a waste of space and can't even climb the ladders properly. How it is going to put its little doggy spacesuit on, or where it is going to find a lamppost on the surface of the moon is never explained.

To successfully complete this stage, TinTin must deal with all the incendiary devices, as well as freeing anyone tied-up. A type of panic button is available in the form of a zero gravity switch, which causes everyone to float about, hoping Snowy doesn't have an accident.

Attacking Boris is best left to Captain Haddock, who will quite happily knock the living daylights out of him whenever they meet.



I'm sorry, TinTin, but I can't hear anything.

According to the instructions, after completing the fifth stage you will "momentarily lose control" as the rocket makes its final approach to the lunar surface. I certainly did, and danced crazily around the room, shouting "Thundering Typhoons!" for several minutes.

Then the rocket starts its landing phase and you must fire the braking motors as gently as possible to conserve energy. For what does energy make? No, not the greenhouse effect, but points.

Entering your name in the hiscore table is also an out-of-this-world experience. Although your country of origin is determined at the start of the game, the keymap is still laid out for a French Azerty system. The graphics are great, the sound is reasonable, but the big question is the gameplay. Quite simply, is there any? To be fair, there is something to do during the platform and ladders parts, but not enough to merit the asking price. Once again, it is glossy effects versus gameplay. And gameplay loses.

John Kennedy

TinTin on the Moon
£19.99
Infogrames

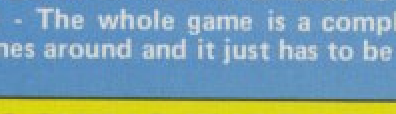
Graphics	
Sound	
Gameplay	
Value	

Overall – 68%

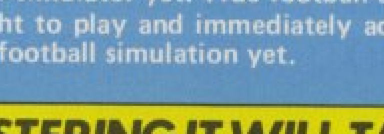


Armed and dangerous

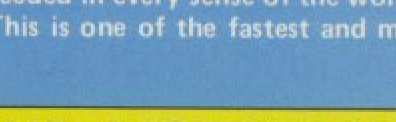




AMIGA



ATARI ST



CBM 64

DAILY DOUBLE

Make mine a large one

EVER since Ug bet Zog a woolly mammoth spleen that his eohippus was faster, horse racing has been a big money business. Since it is well nigh impossible to work out which out of all the starters is going to finish, most of the big money goes from punter to bookie, not the other way, as those in the trade would have us believe as they try to hide their Mercedes AMGs.

Daily Double is an attempt to bring as many factors of the real thing on a computer without having to wade through screeds of confusing options. It uses a simplified form of the American wager system, which is extremely similar to the British one in that it's still easy to lose.

Daily Double
£19.95
CDS

Sound
Graphics
Gameplay
Value

Overall – 57%



Behind bars – the best place for all bookies



Fancy Treat the winner? Boo, hiss – the ref's blind!

A horse can win, place or show – that is, come in in the first one, two or three places respectively. Surprisingly enough, you don't win as much money on a horse to show than you would if you'd bet on it to place. Any bookmaker who ignored this would have a snowflake's chance in a furnace.

There are nine different betting systems, three of them being straight wagering on winning, placing or showing. An exacta is wagered over two horses in the one race; the punter must predict which will come in first and second exactly.

The game is not strictly true to form on this point, because it makes the exacta odds the sum of the standard odds, as opposed to using a separate exacta pool. A daily double is spread over two of the day's races – the named horses must win the chosen races for a payoff. Things start to get faintly confusing when quinellas are brought in. A quinella could be described as an inexacta – two horses in one race are chosen to win or place, but which wins and which places is irrelevant. Well, maybe not quite irrelevant – the winnings on the first horse are staked against the second horse, so the odds should always be as high as possible.

A parlay is the same, but different. Two horses in any two races can be chosen to win, place or show, and the winnings from the first are the stake on the second. As always, winnings from a showing are very much smaller than from a winning horse.

Betting is simplified by having a large form book, where all the horses' previous results are recorded. There are 80 horses and 12 jockeys, each of which perform differently according to the going.

This form book, which will need to be consulted continuously, is printed on thin paper and will become dog-eared very quickly. The form book is also the key to the game, as entry is gained by knowing a horse and jockey combination in a certain race.

Betting is a simple, icon-driven process, and the runners can be viewed for any of the afternoon's 10 races. The aim is to come away with more money than the opposition – up to three other people – after all the races have been run.

Each race consists of some fairly jerky horses juddering along a track, with the top three horses named as the race progresses. A hissy digitised voice proclaims the winner – the whole thing smacks slightly of being written in Basic and then compiled.

To the jaded gamer, Daily Double would probably elicit amused disbelief at how simple the game presentation is. But as an evening's entertainment for up to four racing fans – settle up afterwards in after dinner mints – Daily Double could provide many hours of solid playing.

Stewart C. Russell

APB

Hey, hey, hey ... let's be careful out there

DESPITE what Tengen might try to tell you, APB doesn't stand for All Points Bulletin. It is an acronym for Atrocious Plastic Box, for such is its package.

This box is cunningly designed to crease or tear the instructions while dumping the disc on the floor. It's also guaranteed not to close properly. Me and it don't see eye to eye.

Packaging notwithstanding, APB is a slightly ageing coin-op which is still to be found lurking in university games rooms and other dens of iniquity.

Basically, you control Officer Bob in his adventures as a US traffic cop. He's fairly typical as traffic cops of the American persuasion go, in that his car runs on doughnuts and he runs on petrol. Hang on, reverse that. And spell it donut. Might as well get into the spirit of the thing.

Officer Bob's life is made a misery both by petty criminals like litterbugs and dangerous criminals like dope dealers and snipers. But worst of all, there never seem to be enough donuts out there to keep a man happy.

You gain a demerit if you do a wrongful arrest. Too many demerits and you're trash. Literally. Every day you must capture your quota of wrongdoers or face the wrath of the sergeant, who's a really nice man when you're in his good books, but isn't when you're not. It would be a very humdrum existence, just ticketing litter louts, and perhaps finding time for the odd donut or seven. That's where APBs come in.

If there's a special criminal to be caught you are told at the briefing at the start of the day – Hill Street Blues fans will warm to this – where the criminals are and what they're driving.

If you manage to find the criminals and ram them off the road you get the chance to have the rest of the day off, provided you can get a confession out of the scumballs. You do this by using the age-old police technique of "Er, he must have fell down the stairs guv", being careful that guv doesn't find out.

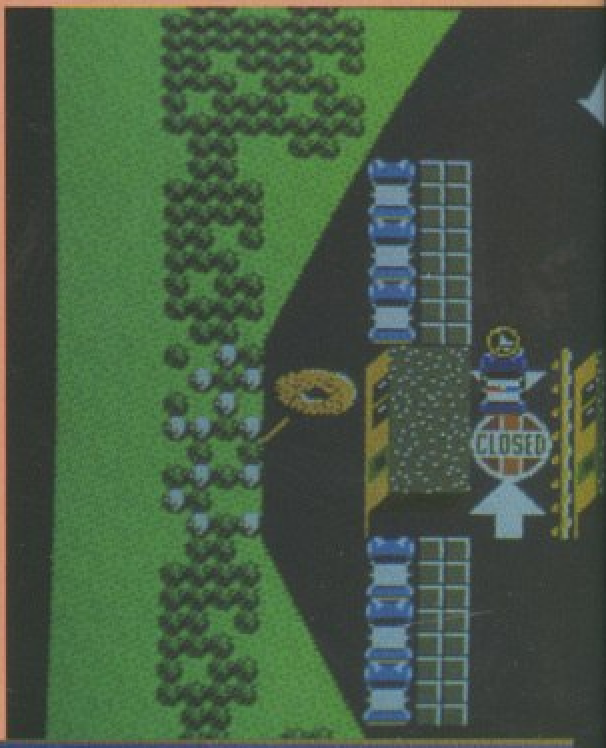
The actual police brutality bit is a standard left-right bash, which gave me acute friction burns off my Konix. I'm suing.

Arcade APB had a huge hi-res monitor – Walking Circles has done a neat trick on the Amiga by overlaying the score bar on the overscanned scrolling area, thereby getting a large display, much much larger than the ST (hawk, spit) version.

It's very fast and handles similarly to the arcade original. The graphics are good – maybe a little drab for the ultra-pedantic – and



Oh no, it's a swarm of dreaded yellow dots



How am I gonna survive without donuts?



Your prize for meeting your quota is a mouthful of cottage cheese

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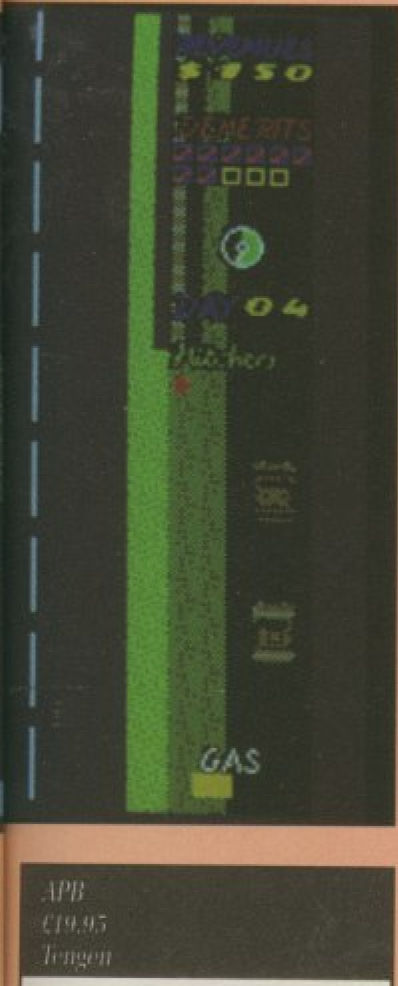
les simi-
nal. The
e a little
ic – and

the sound is a straight lift from the arcade machine. Beautiful.

For once, fans of the arcade machine – and that includes me – can feel right at home. It's not much of a stretch of the imagination to say that it's identical. To use those mortal words from the thankfully now deceased series, The Interceptor: "I like it, Mikey!"

Stewart C. Russell





APB
£19.95
Tengen

Sound	
Graphics	
Gameplay	
Value	

Overall – 92%

POWER DRIFT

Burning rubber



FUN versus accuracy. This is the balancing act which all the creators of the latest genre of driving simulators have to master. Power Drift and Hard Drivin' appeared in the arcades at the same time. One was fun, the other accurate.

Now I'm sure that with plenty of time behind the wheel, Hard Drivin' would be more rewarding. But at £1 a throw I couldn't afford to find out.

So I became hooked on Power Drift, with its huge screen, amazing hydraulics and "faster than the eye could follow" graphics. A machine with more *just one more go* appeal than any other.

It would be a brave man who attempted to convert such a game to a home computer. That man was ZZKJ. He'd been to the brink of technology before with Super Hang On. Now he prepared to dive into his source again. And this wasn't ketchup. The problem with spritey games, like Outrun for instance, is that they look and feel 2D.

Solid games like Interphase feel better but need some serious processing power. And anyway, Power Drift is intrinsically sprite based.

ZZ managed to find a way to store, magnify and rotate sprites so that they appear solid. Then he calculated the relative positions in the same way as he would for a 3D game.

The upshot of all this technical mumbo jumbo is that if one car cuts a corner, slides past a tree and back on to the track to crash into the next car, the graphics all look right. And you really feel as though you've done something pretty clever.

Missing from the conversion are the rotation, including an Afterburner style roll if you crash, and a small map which shows where the other cars are. Nothing to worry about.

The frame rate is acceptable in most places, helped by the blitter. Sometimes it slows to a crawl when there is a lot going on. The person with a Commodore processor card in his A2000 will be surprised to learn that not only does this game load, it benefits from the 68020.

It's exciting, spectacular and impressive. One of the compromises made for the sake of playability is particularly generous collision detection. But then karting is supposed to be a non-contact sport.

The game's got instant "grab the mouse and go" appeal, but also has depth. You won't do well until you learn the 27 circuits.

Master the game for a mode which puts you in control of the Afterburner jet or the Super Hang-On bike.

Me? I'm off karting for real. Let's call it research.

Simon Rockman

Power Drift
£24.95
Activision

Sound	
Graphics	
Gameplay	
Value	

Overall – 88%



See Emily play



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THE SOFTWARE TOOLWORKS

QUEST FOR THE TIME-BIRD

At the third stroke

SITTING in his little hut all alone on the outskirts of civilisation, Bragon waits. Retired hero and inspiration for hundreds of drinking songs, he keeps his battle axe well polished in preparation for what he is sure his future holds – a comeback quest.

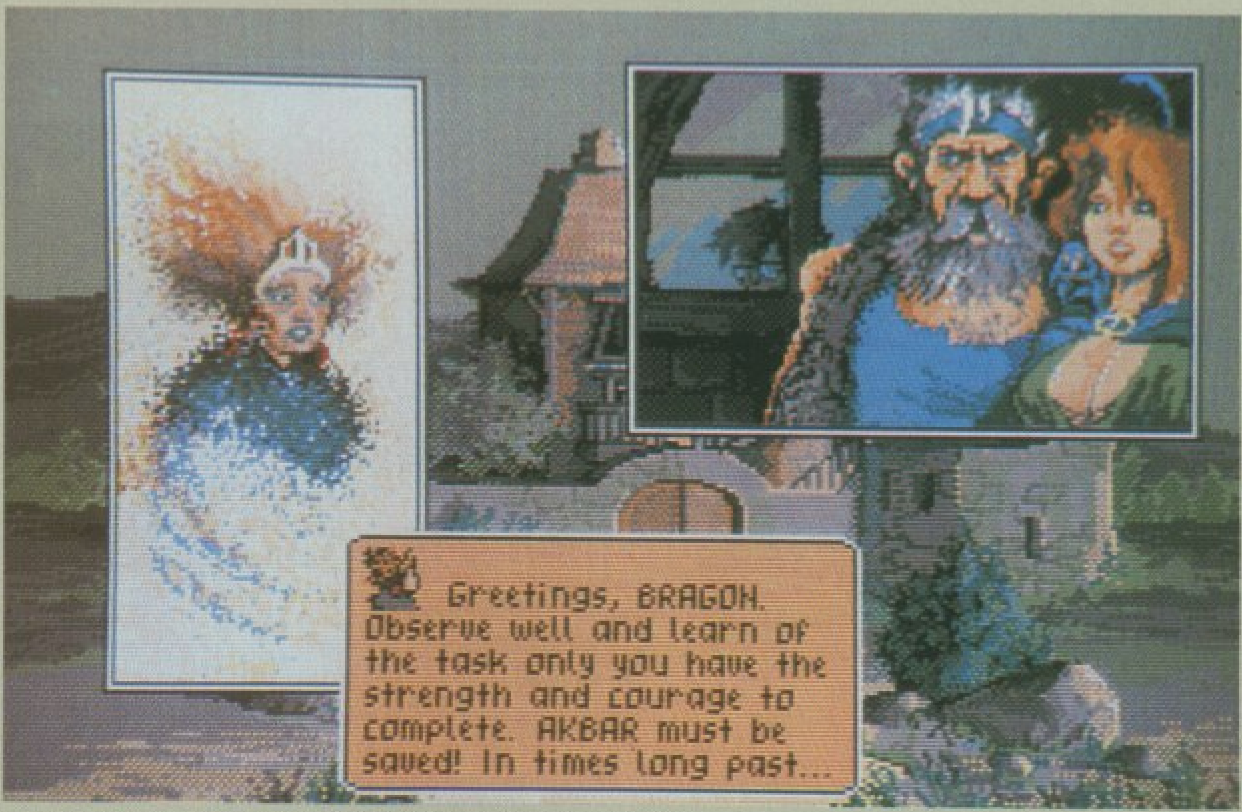
No hero worth his battle harness is ever allowed to sit back and draw his pension. There's always some untold horror waiting to sweep over the land, some wrong to be righted, some...

Hang on – was that a knock at the door? Ah, it's Roxanna, illegitimate daughter of Mara the witch and who knows who else. Here comes the spiel. What's that? Evil empires, hopeless quests, terrible danger...? Say no more.

Pausing only to collect his axe and leave a note for the milkman, Bragon is on his way.

Quest for the Time-Bird is based on the French graphic novel of the same name, which has been mildly popular probably because of the over- exaggerated features of Roxanna.

The adventure is constructed in the style of a graphical multiple choice type game. Decisions are made by clicking the mouse pointer on a relevant part of the screen. This controls the direction in which the party will move and also their interaction with the environment and anyone they should meet.



Let me know if you find out who the bloke looking through the window is

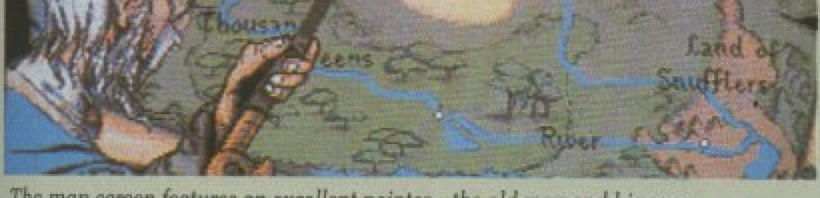
The cursor will change shape on a graphic window to indicate a direction in which you can travel.

Pressing the left mouse button at any time you are not on the large map page will produce a small box containing graphics of everyone currently in your party. Selecting one of these images will bring up a strip of icons of the different actions that character can perform.

The actions are the usual and fairly straightforward ones – Eat, Talk, Kill and so on – except for Charm. This can be used to worm your way into the affections of someone in order to get their help – a particularly dangerous weapon when used by Roxanna, who has a lethal pout.



The map screen features an excellent pointer – the old man and his cane



Have you got Fly Fishing by J.R.Hartley?

Annoyingly, you are only allowed to have one saved game per disc, hardly enough to explore the slings and arrows of outrageous fortune in an adventure such as this where each turn can lead the dusty way to death.

As you might expect from the French, the graphics are superb. Not only are they very detailed and pleasing to look at, but they are displayed with imagination and variety, appearing in different shaped boxes in different areas of the screen.

It shows the thought that went into the layout. It has actually interested me sufficiently to look out for the book.

Well animated sequences appear to break up the journeys, the most impressive of which is when the party is on foot and the foreground scrolls past the bottom of the screen.

Sounds and effects are both well crafted. Each of the seven kingdoms has its own background track designed to enhance the atmosphere of the current location. They tend to get a bit repetitive and brain destroying after a while, but then so does life.

The plot is a little thin, and solving the puzzles is about half- and-half intuition versus persistence. No incredible vulpine feats of cunning are needed to solve The Quest, but this is not necessarily a bad thing.

Overall, a well designed game which will probably appeal more to the casual adventurer than the hardened one.

Lucinda Orr

Quest for the Time-Bird
£29.95
Infogrames

Aura	■■■■■■■■■■■■■■■■■■■□
Story	■■■■■■■■■■■■■■■□□□□□
Gameplay	■■■■■■■■■■■■■■■□□□□□
Value	■■■■■■■■■■■■■■□□□□□□

Overall – 77%

SWORDS OF TWILIGHT

Obscured by the clouds

SOLSTICE is almost upon us, and as we peer through hermetically sealed windows at the ever expanding gloom perhaps we should spare a thought for the residents of Albion where the shadows last all year round and the man from Everest hasn't been seen in living memory.

The Queendom is under threat from the malevolent Shadowlord and his merciless minions, intent on destroying the sacred temples, robbing the land of magic and supporting Millwall on Saturday afternoons.

Your quest is to do something about it – nobody is quite sure what – aided by a brave band of merry men.

This is where Swords departs from the regular plot for role- playing, because from the cast of suicidal heroes you choose to direct three, not one. For this is a *multi-player* role-playing game.

Now you too can invite a few mates round and enjoy the quarrels, bickering and sabre-rattling that were once the exclusive domain of that breed of person who found joy in big books full of tables and even bigger dice.

Alternatively you can elect the computer to control the other two characters and play on your own. This is still not quite like a solo role-playing though because the computer will act under the personalities of the characters it is playing, so they can be just as unhelpful and prone to sulking fits as your mates.

The characters are all chosen from a field of 31, comprising champions, knights and mages. Champions are just knights who are better at knighting, whereas a mage is a generic term for a follower of one of the five brands of magic currently on the market.

Knights come in all skill levels from the belligerent Britomart at sixth level to the lowly Kodak who is still developing. Be careful in your choice though, some weapons are only effective in the hands of a complete novice.

Control is by a sort of menu affair which is activated by pressing the fire button. The options are all pretty basic, pick up and drop stuff, apart from the talk option. This is by far the most important as it handles all the interaction between you and anyone or anything you should meet.



Forsooth, methinks I'll stab a few monks...

The computer will intuitively flavour your speech depending on how wary or friendly you are at the time. If you are suspicious, comments about your name or mission will be more guarded.

It is worth noting that other characters will react depending on how you treat them. It is quite possible to charm even the most depraved of slavering hordes by giving them little gifts and saying how pleased you are to see them.

Reputations will be built from all that you spite and everyone you fight – how you treat people can easily decide your fate.

Travel to the other kingdoms, which will be necessary to complete your quest, is via the ancients' alternative of arterial highways, the Rainbow Road. This is actually an excuse for some gratuitous colour- cycling.

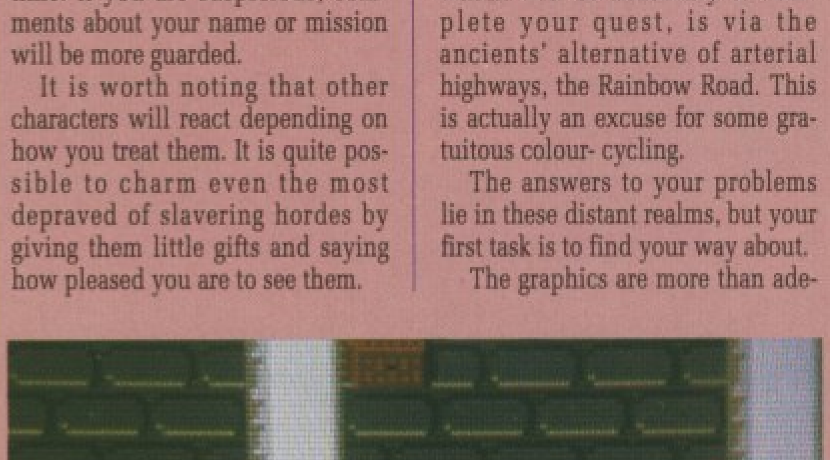
The answers to your problems lie in these distant realms, but your first task is to find your way about.

The graphics are more than adequate for this type of game but the painfully grinding Ring movement will have Wagner turning in his urn. It certainly isn't how George Solti used to play it.

The only real criticism of Swords could equally well be levelled at many of the games in this genre – the incessant and aimless wandering about seems to have been overdone a bit. The plot itself is complex and interesting as it unravels, but if the tedium gets to you before the ogres do, then you'll never find out.

This is a brave attempt at properly reproducing the atmosphere and style of true role-playing. Although not quite perfect, it should find its way into every serious role-player's collection.

Lucinda Orr



Whose idea was it to come in fancy dress?

Swords of Twilight
£24.95
Electronic Arts

Atmosphere
Graphics
Gameplay
Value

Overall – 81%

SK MARKETING

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VISA

FIRE-BRIGADE

Pugh, Pugh, Barney McGrew...

ONLY on a few occasions in the history of mankind have the massed armies of two nations met head to head in pitched battle, most of these in the last century. One such occassion was the battle for Kiev in 1943.

With the defeat of the German army at Kursk during the summer offensive of 1943, the Soviet forces pressed home the advantage and pursued their enemy all the way to the Dneiper river.

Here the Germans hoped to re-group and re-equip their troops before the inevitable bombardment by the Soviets during the coming winter. Stavka, the Russian high command, had other ideas.

So the scene is set for one of the most desperate and potentially decisive engagements of World War II. Can the ruthless and famed German 42nd Korps, nicknamed the Fire-Brigade, turn the tide of the Russian offensive?

Three scenarios are provided, picking up the historical action on progressive dates throughout the winter, effectively deciding how long the game will last. Each turn is a day in game time.

Orders are given to your troops via a complicated system of icons along the bottom of the screen, the sort you have to look up in the manual every now and then to make sure you know what they mean.

Orders are given to the korp commanders, who will then organise their troops in the way they think best to achieve their objectives.

This means that a great deal of your overall strategy depends on your front line commanders, which might not be such a bad thing – after all, most of them are veterans of several years of campaigns.

On the other hand, some of them are useless. Remember, you can transfer units to other korps, so if you find a really bad commander just leave him with a couple of Baldricks and move the good troops elsewhere.

When you have finished your turn the computer will go into the 24 hour game turn. That's 24 hours in game time, not in real, lunch or Greenwich Mean time, though you may be forgiven your mistake because there doesn't seem to be much difference.

If you decide to go away and make a cup of coffee in this game, you can afford yourself the luxury of grinding the beans, percolating it, savouring every last drop and then having another two or three cups before it's your turn to go up to bat again.

There is an option for occasional battle noise to let you know that things are still happening.

Actually, the reason it takes so long is because it insists on animating the map window, with all the units marching about and flashing and blowing up.

This would not be so bad but for the fact that the window updates are so slow, a condition which seems prevalent on games originally written for the Mac. Balance of Power springs immediately to mind.

This incredibly slow response time becomes unacceptable when it comes to giving orders. Changing the standing order for a unit? Click on its icon, wait up to five seconds while the map is redrawn with the selected unit inverted, then select your target.

The scroll bars for seeing the rest of the map are just as annoying. Where can all this wasted time be going? Perhaps this is why the Germans lost.

Fire Brigade needs 1 meg to run but doesn't seem to be doing much with it because in several areas it is less impressive than strategy games running on vanilla Amigas.

High on realism, excellent documentation, but low on playability.

Lucinda Orr

Fire-Brigade	
£29.99	
Panther Games	
Realism	■■■■■■■■■□
Strategy	■■■■■■■□□□
Gameplay	■■■■□□□□□□
Value	■■■■■■■■□□
Overall – 68%	



The scroll bars at bottom and right pull you around the map



Kiev, here I come. .

FACE it, reader-san, ever since you read the book, saw the TV series (again) and decapitated next door's cat with the sword, you've been wondering what it was really like to be an Englishman abroad in the newly-discovered Japans.

Did they really bath that often? Were they really that fanatical? And what about the women?

Wonder no more, for now Infocom has provided you with a ticket back to the 12th century as a pilot aboard a Dutch trader, the Erasmus. Times are hard – there is a religious war brewing in Europe and on the sea no one can hear you sink.

Spanish and Portuguese and English and Dutch men have been blowing each other out of the water for years now, each protecting their valuable trade routes.

Until now the Portuguese have had the Japanese sewn up by controlling the seas to the west of them, the way east being miles of uncharted ocean which only a madman would cross. Enter one madman.

Pilot of the last ship from a fleet of five, you struggle across wide seas with a pitiful crew, most of them dead, the rest dying. As you brave a fierce storm you suddenly sight land. This is where your adventure begins.

Unless you are a complete landlubber you should find it pretty easy to salvage most of your ship plus a few of your crew if you are lucky. Capture by the Japanese is a certainty.

As a stranger in a strange land

SHOGUN

If you knew sushi like I knew sushi...

you must learn quickly or die. Your future depends on how quickly you grasp the Japanese way of things, their brutality, their strange code of honour, their odd bathing habits, and their funny curvy swords.

Progress is hampered by your total inability to speak anything even slightly approaching Japanese. A translator is on hand, but he is a Portuguese priest – your sworn enemy on both counts.

Trying to get your point of view across can be a bit difficult when your interpreter thinks you're a heretic pirate. Your overall objective may be fame and riches, but just staying alive would be all right for now.

The text of the game is surrounded by a pretty Japanese-style border, which changes as you progress through each part of the adventure.

Pictures occupy the same part of the screen as the text, and scroll away as the text wraps around them and fills the screen. This gives the impression that you are reading a book or parchment and adds considerably to the atmosphere.

The adventure is split up into different sections or events, like scenes in a play, which must be completed before going on to the next.

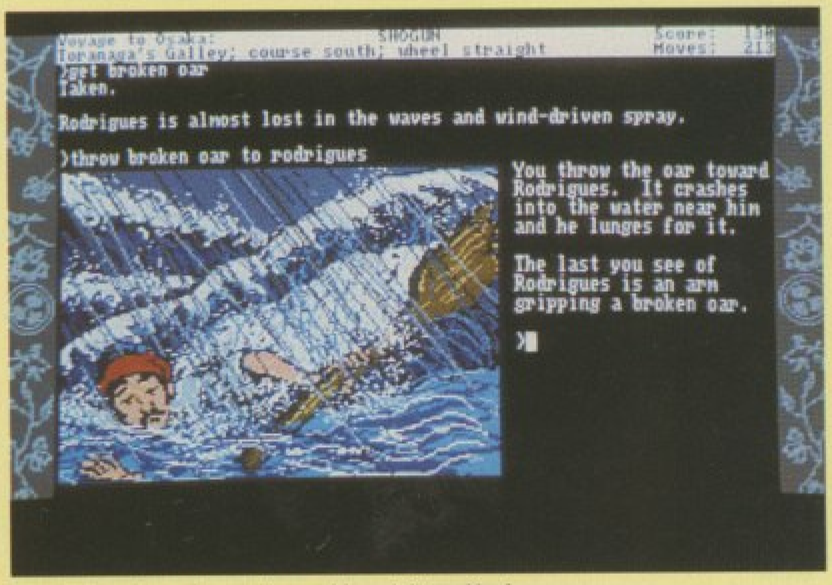
At the end of each section you will be told how many points you got out of the number available for that section and your running total before being given various options – whether to continue, whether to get a hint, and so on. You've heard of modular programming? Well this is modular adventuring.

Shogun is an adventure unlike most others in that it is orientated towards solving situations rather than puzzles. That is, it is more important to think and to do than to collect lots of objects and manipulate them in some way. In this respect Shogun is, dare I say, more intellectually challenging than many of the popular adventures.

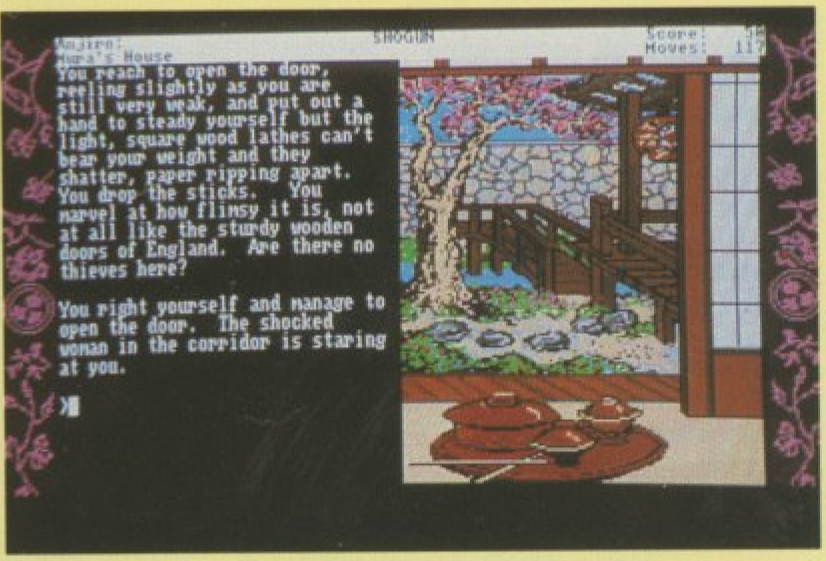
As one of the last efforts from the team that showed the world what adventures are all about, this is one to be proud of.

Lucinda Orr

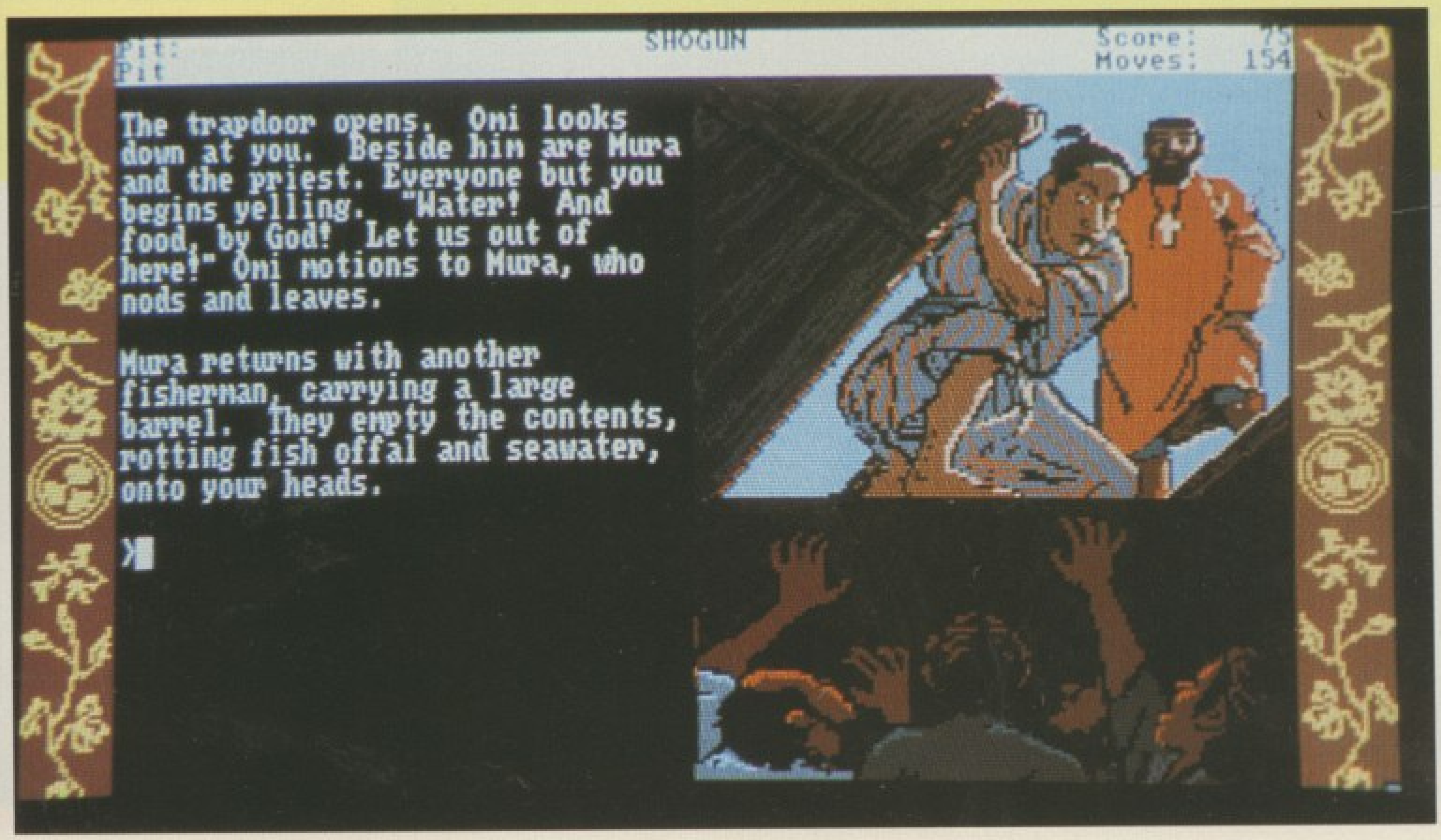
Shogun £24.95 Infocom	
Aura	
Story	
Gameplay	
Value	
Overall – 84%	



With a bar of soap I guess he could wash himself ashore



Crazy paving up the wall?



Hello Sooty, what are you doing in there?

ACTION FIGHTER

Let's get this show on the road

NOW *this* is what I have been waiting for. Chuck away the instructions, we won't need them. Just pop the disc in the drive and flex those wrist muscles.

A few presses of the Fire button and already the game has started. No tedious little animations or jingles here, this is serious arcade gaming. A conversion of a Sega coin-op no less, and for once the arcade feel has been carried through to the home computer.

Ah, the joys of hardware scrolling. It's been a while since there has been a serious attempt to produce a vertical scrolling road game.

This one is just the way I like them – swing a leg over your motorbike and with a squeal of Dunlops you're off, leaving only a treadmark on the gunmetal road.

Sneak up behind a few cars and open up with the cannons, riding through the explosions in search of a few more to take out. Gangs of dispatch riders can be bumped off the road, but pay special attention for the Sunday drivers doing 20 in their red Ladas.

Extra weapons are supplied by a small truck which allows you to ride up inside while the pit crew fit the extra cannons front and rear, guided missiles and a neat line in all-over body shields. The missiles are especially useful for taking out the helicopters which buzz around dropping the occasional bomb.

Your reward for destroying all the excess traffic is to have your bike upgraded to a car. The obvious insult of having your lovely bike replaced by a cage on wheels is quickly remedied by a press on the spacebar.

Just as in real life, riding a bike has many benefits over the car, although the more cautious and uncool among you may wish to stick with four wheels and the resulting loss of manoeuverability and acceleration.

The helicopter pilot is obviously in the British Motorcycle Association because he only attacks you when you are driving the car.

Once various little floating letters have been collected, the whole game changes. Now you're flying a jetcar over enemy territory, with cannons and bombsights to match.

The landscape scrolls smoothly underneath, with little gun emplacements and depots to bomb. Airborne mines and fighters attack, but your pitcrew has followed you into the skys flying a large Heliship for those little cosmetic changes...

Finally you cruise over a large software house, err, ocean, where



Aha! A little red flag. Yes. Erm...

the mission objective may be accomplished by destroying three U-boats which rise and fall like Amstrad's profits.

So ends the first level. With four more to go you soon wish for a *Continue?* option. But since there isn't one, you make darn sure that every life counts. Each mission features extra baddies, so there is always something new to look forward to killing.

The Pause button is essential for background tasks such as eating, visiting the bathroom and drinking coffee, while the President gives you yet another death-defying mission to undertake. (Where *is* Dan Quail?)

Action Fighter manages to cram every conceivable scenario from every vertical scroller ever written into one jam-packed game.

With five multi-stage missions, it will take a long time for your wrist to recover from this one. It may look five years out of date, but it's true arcade action.

Everyone needs at least one shoot-'em-up in their software collection not written by the BitMap Brothers – make sure it's Action Fighter.

John Kennedy



Two wheels good, four wheels bad

Action Fighter
£24.95
Firebird

Sound	
Graphics	
Gameplay	
Value	

Overall – 87%

SHINOBI

It was brilliant on the 64...

THE copywriter at Virgin must be in a very, very bad way. This poor creature, in all probability locked up in a dingy office and fed on stale chips and cold tea, has spent so long studying computer games that its gone insane.

It can now take a perfectly ordinary arcade game plot – Shoot A$, Rescue B$, for example – and turn it into a deeply moving human drama, with a few bargain basement laughs thrown in for dramatic effect.

So Shinobi, a "shoot anything, rescue children" game has been turned into a mixture of Dirty Harry and The Pied Piper.

It seems that some wayward ninja has stolen all the children from the local ninja academy and is demanding a ransom. This isn't acceptable to the good burghers (this has nothing to do with Wimpy, by the way – I did say good) and it's up to you to do the rest. Gosh.

Your initial weapon against all the bad people is a limitless supply of throwing stars; to call them shuriken is, apparently, incorrect. After you save a few children, you get to throw slightly more dangerous things.

Once per stage you can use a very tedious form of ninja magic, which takes ages to do and is really only an oriental smartbomb. Your ninja-person says something which probably translates to something obscene or impossible, or both.

At the end of every level – each level has several stages, y'see – you get to meet The Big Baddy who is difficult to kill and will probably kill you first.

Following this, if you have managed to keep some lives, is a boring bit with bouncing ninjas and more throwing stars. It's meant to be a bonus stage, but interest-wise it's zero rated.

Look, let's get this straight – I've nothing against ninjas, not personally at any rate. I mean, I'm ready to believe they're invincible. But then again, when threatened with that metallurgical marvel that is a ninja sword, I'd be apt to believe anything I was told.

But if I was a ninja, which I'm not, at least not consciously, I'd be somewhat annoyed by all the crappy games about the profession. It's a job, innit? Like quantity surveying, or being a turner? How many games are there like The Last Quantity Surveyor, or Bad Dudes vs Dragon Turner? None.

But even as a non-ninja (a nonja?) I'd be peeved about Shinobi. First off, the music is terrible, sounding like it's being played through a sock. Also, the poor disc drive is forced to make arcane gronks and squeaks by the loader; at first I thought it was part of the tune.

The graphics have been carefully chosen to avoid attribute clash, because they're not bad in the ZX Spectrum league. And not merely do we have the de rigeur YASTP 200-line screen, but it's narrower on the sides, too.

Stewart C. Russell

Shinobi
£19.99
Virgin/The Sales Curve

Sound	
Graphics	
Gameplay	
Value	

Overall – 53%



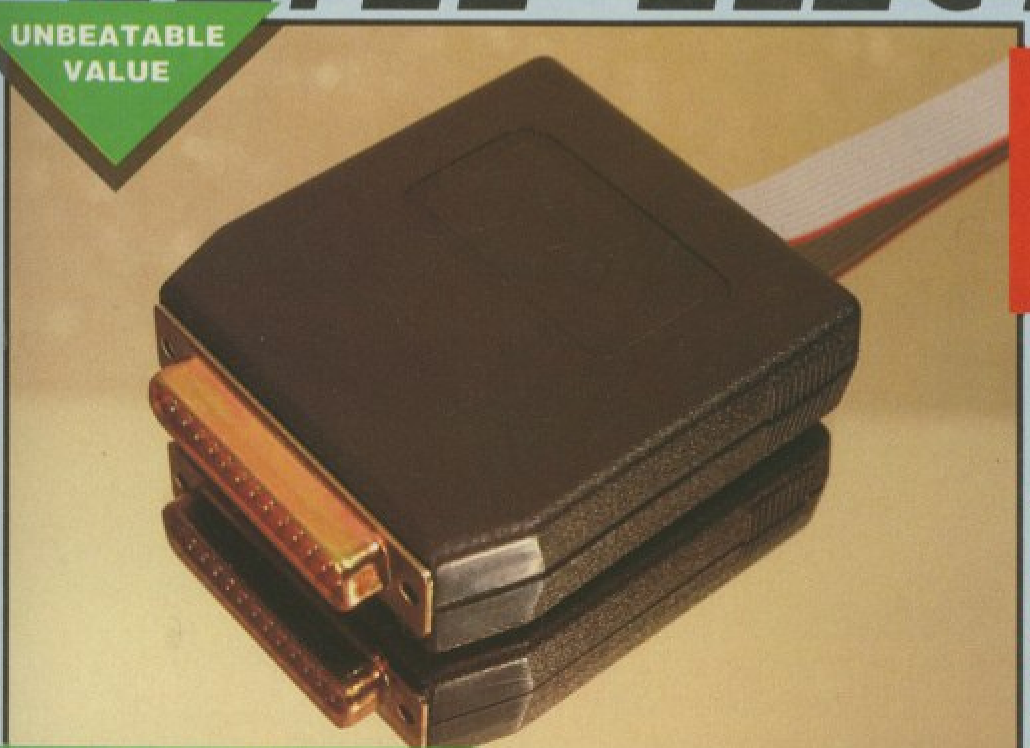
Spiderman, Leapfrog... what more could you ask for?



Don't shoot me, I'm only the piano player

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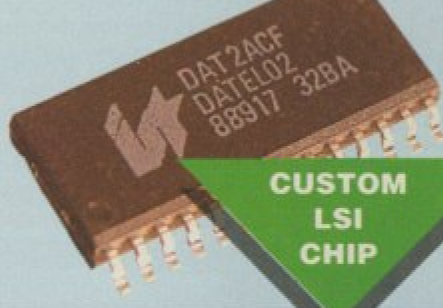


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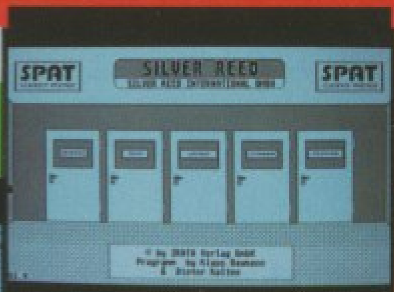
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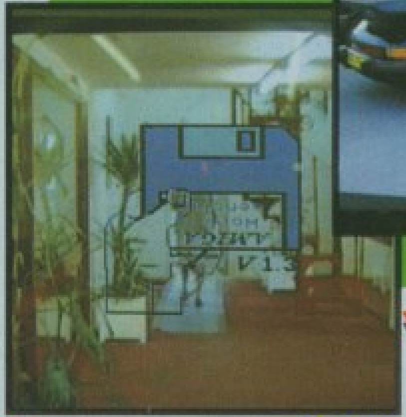
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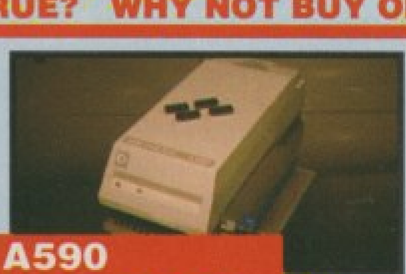
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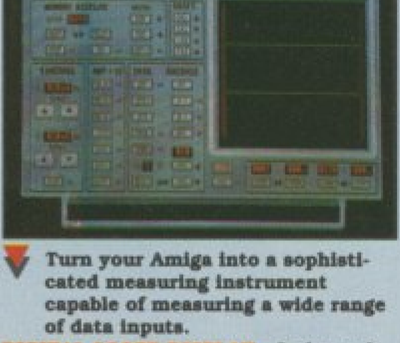


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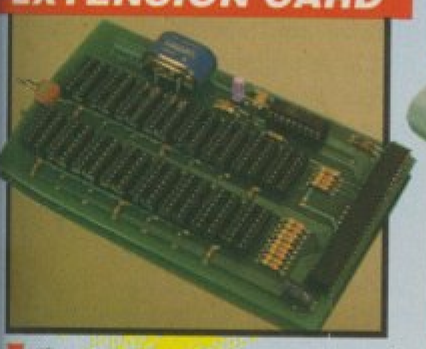


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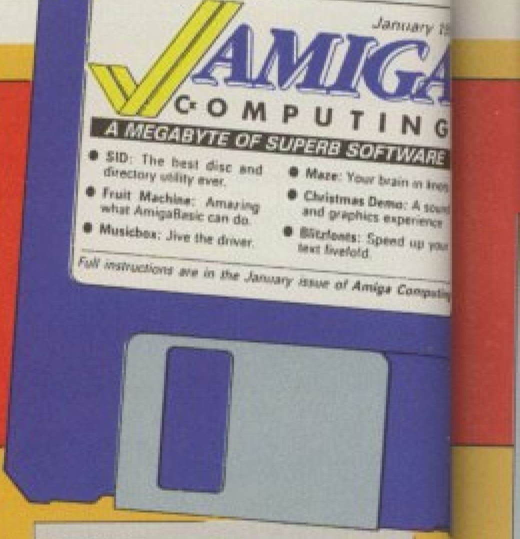
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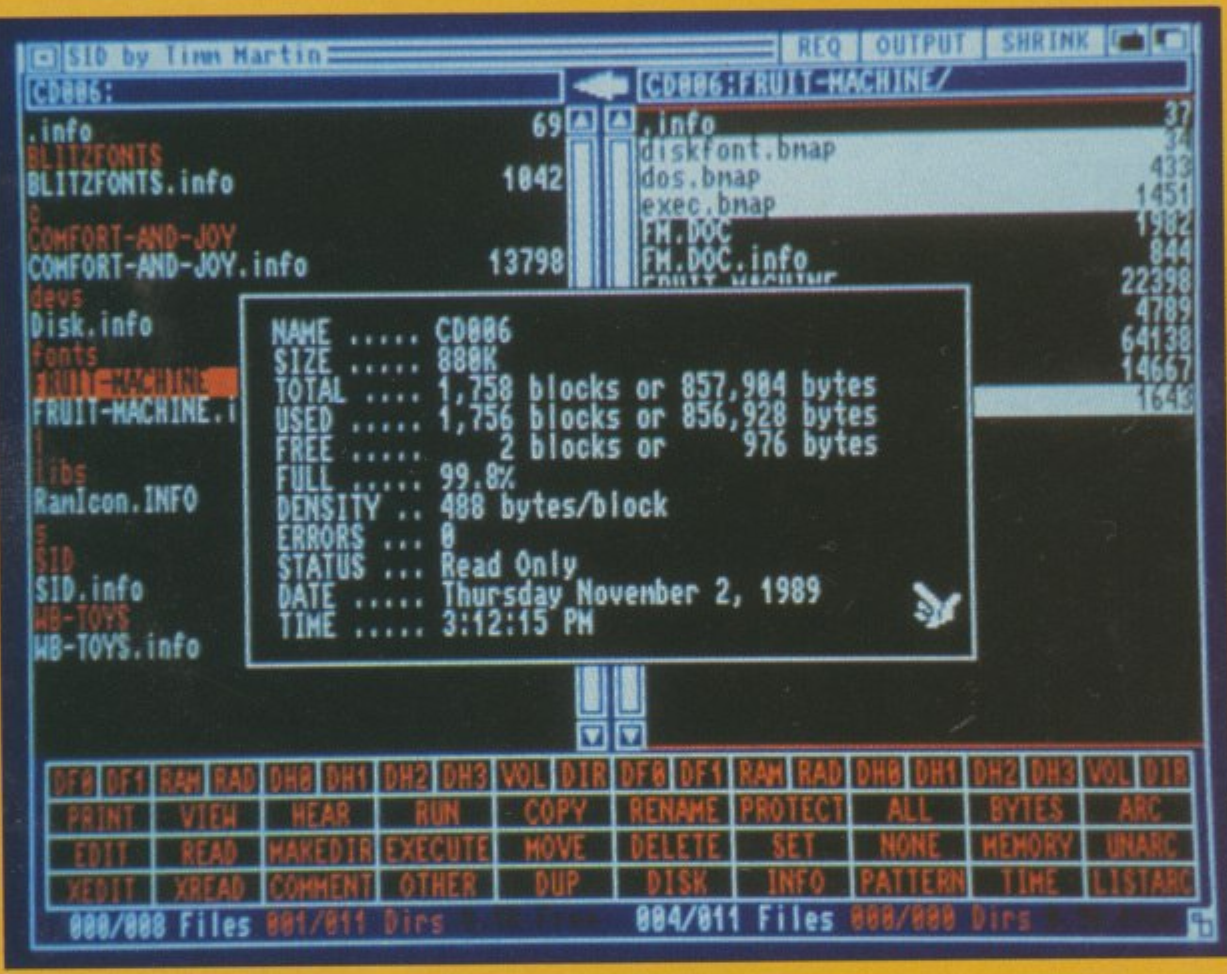
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Jeff Walker presents...

THE DISC





SID

SID has been in development since October 1988. It underwent nine months of rigorous testing by more than a dozen people. After 26 updates, one complete rewrite, hundreds of hours of work and over 513,810 bytes of C and assembler code spread over 77 modules, SID has emerged into what Timm Martin, the author, hopes you will find is the best directory utility available for the Amiga.

I know I've certainly found it indispensable. It sits there in its shrunken mode all the time on my triple floppy, 3 meg A2000 with 20 meg hard drive *(Showoff – Ed)*. I used to run a mixture of Disk Master and UtilMaster. But no longer.

A few things to make a note of before you start using it in anger. Firstly, SID needs an S: directory. It needs it because that's where it looks for SID.config, its configuration file. Therefore, the best thing to do with SID is put it in your C: directory on your boot-up disc and run it from a CLI or Shell. You can supply parameters, like so:

```
sid df0:c ram:
```

If you're not a CLI person put SID and its .info file in your boot-up root directory. Then you can double click on SID after opening the disc window. Simple.

The most difficult part of SID is its configuration. Read the Configs.Doc file thoroughly. You'll soon find that SID can be set up just the way you like it very easily indeed. It's just a question of getting the hang of how to change things. Play around. Have fun. But make a backup first!

All sorts of stuff can be run from within SID – archiving programs like Arc, Zoo and Pak, file and disc editing programs like DiskX, NewZap and Ed for instance, IFF viewers like Display or maybe Show – it's you who chooses what programs will run when you click on the buttons. Of course what you choose to run depends on what you've got. You can't run DiskX if you haven't got it. Perhaps you've got a different PD disc sector editor. Sectorama maybe. Likewise with the archiving programs.

Most of the buttons will work without the need for extra programs. The Read button uses an internal file viewer, likewise Xread. A few more buttons – Run, Delete and Rename, for example – use commands from the C: directory.

SID is a hell of a lot of program. If you've got the hang of it by the next issue you'll have done well. Give it your best shot, it's more than worth the time.

NULL: – a better way to die

NULL: is a new AmigaDos device. SID will run with or without Null: mounted, but it works better with it. Null: doesn't do anything brilliantly useful, it behaves just like Nil: in that you can redirect a program's output to it.

This is often useful to kill those boring and time-consuming copyright messages that clamber down the screen if you initialise a lot of PD stuff in your Startup- Sequence.

For instance, I've used this technique in the Startup-Sequence on this month's cover disc to zap the awful BlitzFonts copyright message:

```
BlitzFonts/BlitzFonts >NIL:
```

But Nil: is not a "real" device. In fact it's not a device at all – it's merely an AmigaDos convention. Null:, on the other hand, *is* a real device. It has a handler and it has to be mounted.

Null: is very easy to set up. After you've unarchived all the SID files you will first need to copy the file called null-handler into your L: directory. This is the L directory on your normal Workbench boot-up disc.

Next you need to add an entry to your Mountlist, which is nowhere near as daunting as it sounds.

Boot up your Workbench disc, open a Shell or CLI and type:

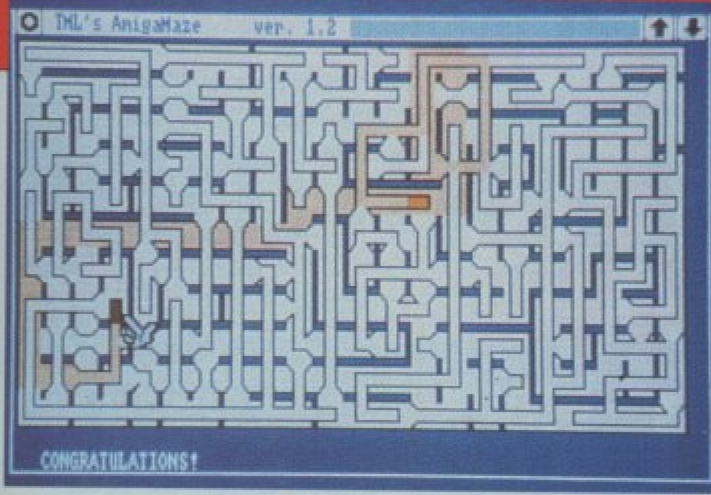
```
Ed Devs:Mountlist
```

You are now editing the Mountlist file from the Devs: directory on your Workbench disc. Cursor down to the bottom of the file and type in the lines shown in

```
/*
        Installs null-handler V 0.0 (C) Gunnar Nordmark
*/

null:       Handler = L:null-handler
            Stacksize = 500
            Priority = 5
            GlobVec = 1
#
```

Figure I: The Null: entry to be added to your mountlist



Maze

YOU are lost in some twisty passages, all alike. Classic words which will bring a flush of excitement to the cheeks of any adventurer. But today you won't have to make a map or examine anything.

The author of Maze, Todd Lewis, invites you to share this public domain program with your friends.

Don't knock it. It's a neat little Workbench toy which fills a gap. It doesn't need an explanation.

Try it.

Figure I. The # at the end is very important, it marks the end of a Mountlist entry.

When you're finished press Esc and then X and then Return. The new Mountlist will then save back to your disc.

Next we have to alter your Workbench disc's Startup-Sequence so that it mounts the new device. When you've got your CLI or Shell back, type:

```
Ed S:Startup-Sequence
```

If you've got a section where lots of other devices are mounted, like Pipe: and Speak:, then tag:

```
Mount NULL:
```

on to the end of the list. Otherwise enter it just before LoadWB. Press Esc-X and Return to save the new Startup-Sequence and exit from Ed.

Now next time you boot from that disc the Null: device will be mounted. After that, use it from AmigaDos just as you would Nil:

Unarchiving SID

SID and its accompanying files are so large that I felt it best to archive everything into one file. This has the added advantage that it takes up only half the room the unarchived version would have done.

I've written a script file that will unarchive everything automatically on to a blank disc for you. Well, it doesn't have to be completely blank. As long as there's at least 300k of space there, SID will fit. After last month's successful attempt at an automatic script with Workbench 1.3.2, I feel confident that I'm on to a winner here.

It all works with DF0: and RAM: – no need for second drives or extra memory – and there's only one disc swap, not counting the request to replace CD006 when it's all over.

If you're running an unexpanded A500, you may be flying a bit close to the wind. I've tested it and it works every time, but I wouldn't try multi-tasking, the script will almost certainly bomb out with a rude message.

Ease your conscience

SID v1.04 is now available to all registered users. To become one send in your $25 shareware fee today and enjoy the benefits, which include the most recent version of SID sent to you on disc, any available support programs, the most recent version of the manuals, a set of update docs which describe the changes made in each SID update, a number of Software Ingenuity freeware programs and utilities, plus timely announcements of major future upgrades.

Send your money to: *Timm Martin, Software Ingenuity, P.O. Box 10084, Largo, FL 34643, USA.* I know I have.

The Christmas demo

HO, HO, HO, little boy – have I got a surprise for you! Festive greetings and other assorted seasonal clichés to you all. To get you into the Yuletide swing of things, here is Jolyon's Christmas Demo.

More festive than a set of broken fairy lights, more jolly than Santa after drinking eight million glasses of sherry in Northern Europe (not including Poland), and decidedly more tuneful than Granny when she starts throttling the ivories.

This month's stocking filler is full of features like snow and, um, snow and, um, I think there might be a robin in there too. Ah yes. And the scrolly, which should last you well into the New Year. (Readers in Scotland will have their own thing called Hogmany.)

Merry Christmas everybody!



Blitz Fonts

WE all know how slow (yawn)... Erm. Where was I? Oh yes. We all know how slow the system fonts are on the Amiga, even with FastFonts (FF) from the WB1.3 disc running. But before you build a morse code interface for your A500, take a look on yonder disc. For here, leaping small buildings in single bounds, comes salvation in the form of BlitzFonts.

Run it from CLI or click on it from Workbench and it will make text appear on the screen up to six times faster, provided you're using the standard Topaz 80 font. Yes, now you can pretend you too have a 68020 board.

Even more astounding, it does all this in less space than the size of the average font – a minuscule 3072 bytes.

Now don't say I never give you anything.

Flash the cash

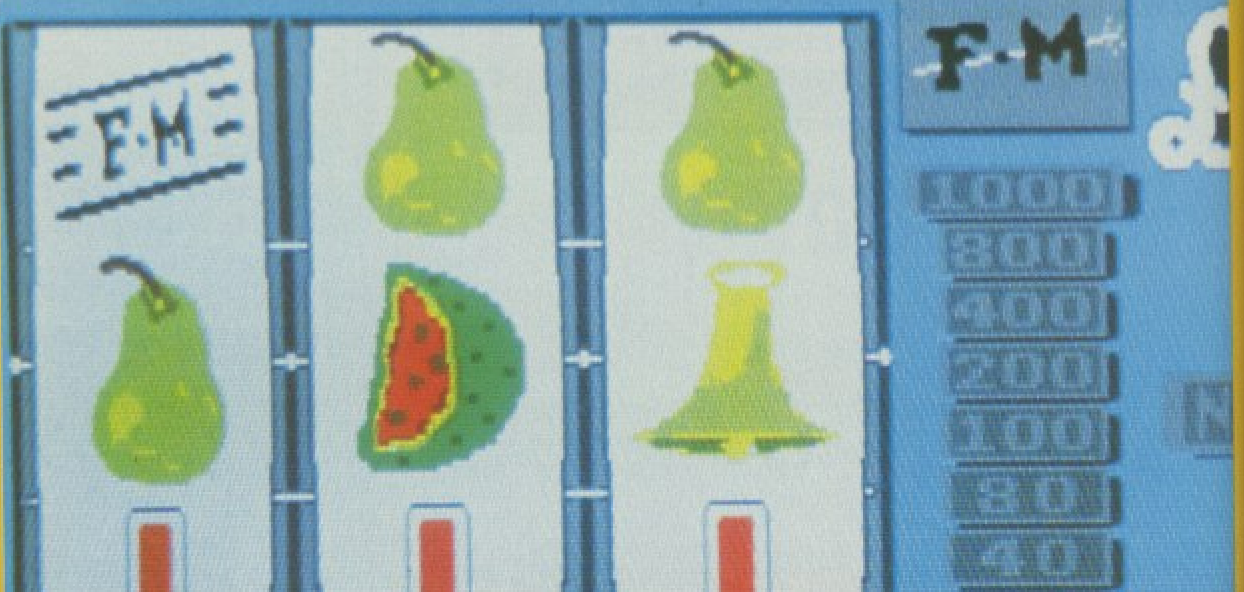
THE author of BlitzFonts wants you to give this program to every person you know who owns an Amiga. But come on, guys, this is shareware. So let's do our bit for this brave breed of person who foresakes commercial gain by supplying you with quality software, asking only a small registration fee.

Rush $10 to: *Hayes Haugen, 11303 South Dogwood Lane, Edmonds, WA 98020-6168, USA.* In return you'll receive the latest version of the program – that's the one which works with custom fonts – plus a bunch of other shareware programs by the same author.

Reader contributions

FRUIT MACHINE

by J.W.P. Allison



WARNING: When you first run Fruit Machine there is a possibility that AmigaBasic will point to a line of the program and give an "internal error" message. If you click in the OK box and press Right-Amiga-R to re-run the program, it will work fine.

Now if this does happen to you it is very, very, very important that you don't ring me up and complain. It is not my fault and I will only get upset and throw things at Green.

The real fault – surprise, surprise – lies with AmigaBasic. There is a bug in it which seems to let the system get ahead of itself at times.

If this sounds a little vague and implausible, try ringing up Commodore Technical Support, who will give new depth and meaning to terms like vagueness and implausibility.

Seriously though, if this does happen to you, get in touch with Commodore – the responsibility for AmigaBasic working properly belongs to the boffins there, not me. The more people complain, the more likely Commodore is to do something about it.

Gripe over with, on with the show.

OK, how many of you guys remember paddling your Vespa down to the local arcade through torrents of acid rain just so you could have a go on the one-armed bandits? Well, now you can sit at home and watch the rain – if you can tear your eyes away from the fantasmic display of Fruit Machine, that is.

It's got all the features you'd expect from the latest Japanese hi-tech moneyeaters that inhabit dark and noisy seaside places – gamble, nudges, re-spin, stop and win – all of that. It even has a nifty attract mode.

Check out which keys do what by reading the doc file and then get those cylinders tumbling.

That a program works at all in AmigaBasic is something of an achievement, but one that works as well as this is nothing short of miraculous. Well, it is the season for them, I suppose.

The man – no, let's not be afraid to say it – the genius who brings you this astounding piece of well crafted code is J.W.P. Allison. His achievement is made even more remarkable by the fact that he produced it on a vanilla A500 and an old colour TV. All you double-drive extended memories out there can hang your heads in shame.

This is more than a game, it's an education. If you like to learn by example, this is the most impressive demonstration of an AmigaBasic game that you are ever likely see.

Unless *you* know different?

Problems with your disc?

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I'll Name That Tune

WE'RE all sitting around in *Amiga Computing* office scratching our heads saying, "I know the tune – can't quite put my finger on it."

Do *you* know the origin of month's MusicBox song? G says the intro reminds him Peter Gabriel track. But it's Peter Gabriel. Is it?

Drop convince you the it fills tv trouble. Send bootlegs *That Tu North He Brentwoo*

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Music Box

NOW ladies and gentlemen, for your delectation and general entertainment, The Disc proudly presents the PD cabaret program that is currently touring the memory maps of Amigas everywhere. Well it should be, but it isn't. So here I am, doing my bit for audiophiles, which is *not* an illegal pastime.

MusicBox is completely foolproof. Just double click on the icon and this little software bundle of bits will do the rest. It automatically detects the presence of up to 10 compatible song files in its directory and starts playing.

A compact window will appear giving you a brief insight into what is going on. On the right-hand side will appear the song which is currently playing, while on the left is the playing mode. MusicBox has all those fancy things you find on expensive CD players, like random, sequence and loop.

Ahem. Of course this won't make too much difference to you at the moment because I could only fit one song on this month's amazingly packed disc. But now you've got the player I will try to give you one or two more tunes every month.

The author of MusicBox, Peter Dunlap, tells me that he has more than two dozen of them so far, and there's an upgrade in the air. Next month probably.

Oops. Nearly forgot. The bestest thing about MusicBox, apart from the fact that it's public domain, free, priceless even, is that it multitasks beautifully and uses very little processor time. In fact I'm listening to it as I write this. Amazing.

Drop me a line and if you can convince me you're right I'll send you the full MusicBox collection – it fills two discs so far – for your trouble.

Send your letters (bribes and bootlegs welcome) to: *I'll Name That Tune!, Amiga Computing, North House, 78-84 Ongar Road, Brentwood, Essex, CM15 9BG.*

AMIGA COVER DISC

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WE are always looking for original contributions for the *Amiga Computing* cover disc. If you think something you have written or drawn is good enough to share with everybody else who reads the magazine, send it along and we will have a look.

If we like what we see, it could earn you up to £1,000.

Please let us know which files, if any, your submission needs from the Workbench disc. If it is clickable, feel free to design an original icon. But don't make it too big. And please use the standard Workbench colours.

Bear in mind that a program which does not run on a 512k machine would have to be exceptionally good to make it on to the disc.

Remember that *Amiga Computing* will only buy your work on an all rights basis. We are not prepared to buy the rights to programs which are already in the public domain or have been spread by any other means.

Please enclose this coupon, or a photocopy of it, with your submission. Include a file on the disc with full documentation, your name, address, phone number and a few details about you and your kit. A mugshot would be nice, but isn't essential.

Don't forget to duplicate on the disc label the program name, your name, address and phone number. If you want your disc back, enclose the correct amount in stamps.

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Address ....
....
....
Daytime phone.. After ....am
Evening phone.. After.......... pm
Submission name ....
Submission size.. bytes in total

NOTE: We will accept submissions up to 500k in total length, including documentation. But the shorter your submission, the better chance it stands of getting on to the disc. If it is a compiled or assembled program include all the source code, but do not count this in the size of the submission.

Write a brief description of your submission below. If it consists more than one file, describe what each file is for. Attach an extra sheet of paper to this form if necessary:

....
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....
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Sign this declaration:

The stuff on this disc is mine. I didn't nick it off someone else. It hasn't been published before and I haven't submitted it elsewhere because I want *Amiga Computing* to publish it.

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Post your submission to: Jeff Walker, Amiga Computing, North House, 78-84 Ongar Road, Brentwood, Essex, CM15 9BG.


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Budget Banzai



The capitalist ethic of competition over in Japan results in better, cheaper printers over here. Duncan Evans looks at the results

BEWARE the Jap attack. Epson, once the premier printer provider that set standards others were proud to measure up to, is under attack from Citizen and Star. The Eastern front is the race to produce a low cost 24 pin printer. At the 11th hour Epson has replied with new 9 and 24 pin machines.

The Epson LQ-400 retails at the very low price of £345 before your friendly dealer applies the usually substantial discount. This alone makes it something special.

The LQ-400 is no Tardis. Measuring 13.9cm by 39cm by 32cm, it looks quite flat, even with the single sheet feeder attached. But it gets bigger on the outside when the tractor feed and its monstrous cover are fitted. This transparent carbuncle makes the whole thing look like a greenhouse designed by aliens. Still, aside from that, the LQ does at least look like it might do the job asked of it.

Lifting the lid reveals Epson's folly and the extent of the cost cutting. There's no bail bar, just a ridge leering down from the underside of the cover.

Unfortunately it doesn't leer far enough, so when the auto load – a misnomer as you have to press a button unlike Citizen's Swift-24 – winds the paper on, the guiding ridge is still out of reach and the paper is held to the platen only by the print head. Unless you remember to throw in a few line feeds there's a good chance of the paper fouling. Cheap in the derogatory sense.

This is a heavy baby. Thanks to the copious metal shielding inside the case, the printer weighs in at 7kg.

Typestyles include double strike, emphasised, italics, shadow, outline, double width, condensed, double height, underlined, strike through and overline. Print quality is fairly good, though not quite as good as the Swift-24, with characters consisting of a 9 by 23 dot matrix in draft mode and 29 by 23 dot matrix in the NLQ modes. However, the print speeds will hardly set the paper on fire, as can be seen from Figure I. Printing doesn't have to be limited to 10 or 12 cpi, it can also be 15 cpi or proportional.

CPI	Quality	CPS
10	draft	150
10	NLQ	50
12	draft	180
12	NLQ	60

Figure I

The LQ-400 pauses for thought between printing lines. This overhead means that while the draft speed of 150 cps at 10cpi is particularly disappointing, the NLQ speed of 50 cps is acceptable.

Unlike many competitors, the LQ-400 prints in black only, there being no colour kit options. In fact the only other accessory beside the font cards is a single bin cut sheet feeder. A printer buffer of greater size than the 8k one built in will have to come from a third party supplier. The merely adequate buffer can be switched to 1k

only by using the DIP switches if required, though why you'd want to is anyone's guess.

With the Epson LQ-400 being a new printer there won't be any drivers to support it just yet.

I tested the printer out with the KindWords word processor which uses Workbench 1.3 and the new printer drivers. This was fairly unsatisfactory, producing spurious characters. Scribble wasn't much better, and of the programs I tested only Pagesetter, the DTP package, showed a desire to cooperate fully.

If the software allows you to define your own drivers there should be few problems as the manual gives a guide as to all the codes involved in setting one up. It also lists the LQ's printer codes to enable direct programming.

Remember, AmigaBasic filters out ESC codes with LPRINT, so you will have to open a channel. The printer's manual isn't chock-a-block with information mind you, but at least it is written in English.

The Epson LQ-400 is one of the cheapest 24 pin printers and will undoubtedly be discounted. A quick call around some discounters showed that it should be easy to save £100. It offers a reasonably good NLQ print quality and speed, but a poor draft performance.

The two fonts are nice, and there is the option to buy extra ones. It isn't as sophisticated as other 24 pin printers, but then it is cheaper.

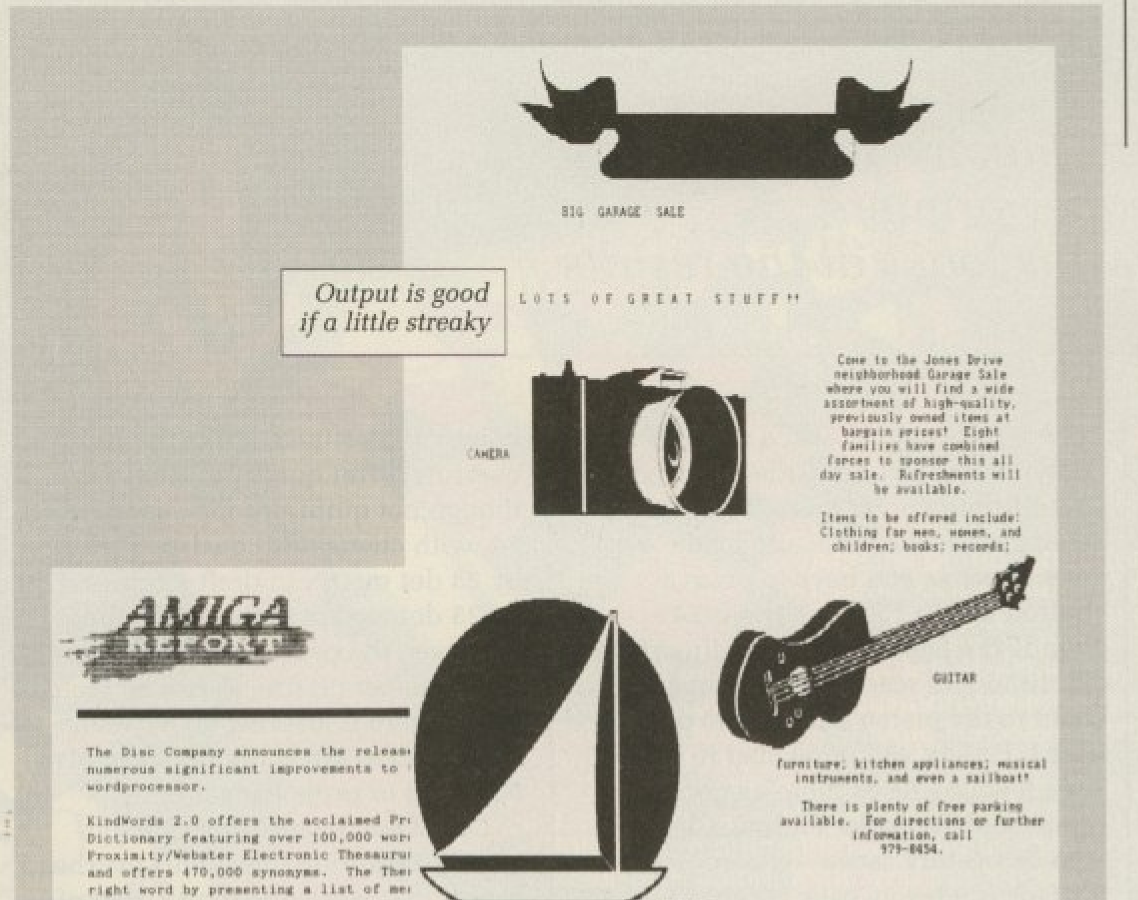
If you can live with the single sheet feeding problems, only have a limited budget, and yet must have the extra quality of 24 pin printing, then the LQ-400 will be good value for money.

Knowledge of fonts

USERS who don't bite their fingernails can get to a cut away section which holds the slot for extra fonts cards. Epson offers quite a range, including Courier, Prestige, Script, OCR-B and Multi-font. But at £50 each you are not likely to want to shell out for too many.

Built into the LQ-400 are Epson Roman, Sans Serif and a draft version of Roman.

Fonts are selected from the three button control panel on the top of the printer, which uses a series of lights to indicate which is being used. Unlike the 9 pin version of this printer, the LX-400, it isn't possible to access the various typestyles except by using the DIP switches on the back or under software control.



Output is good if a little streaky

Kind words had some problens

REPORT CARD

LQ-400 £343.85
Epson 0442 61144

EASE OF USE ...
Goes wrong if attention isn't paid to the top of a single sheet of paper.

SOFTWARE........
The Workbench 1.3 drivers didn't really like the printer. A number of programs threw spurious characters on to the page.

SPEED ....
Strangely slow between lines, and then not overly quick. Quiet except for graphics which produce a screeching noise.

VALUE ....
Very cheap, even if a few corners have been cut to make it so. Not particularly sophisticated but a good workhorse.

OVERALL 70%

Epson is the industry standard so expect to find the lack of dedicated printer drivers remedied shortly. Characters can be downloaded from the Amiga into the LQ-400, but a DIP switch has to be set to Off first. It isn't particularly quick, but the quality of the NLQ makes up for that. A good buy for those on a low budget.

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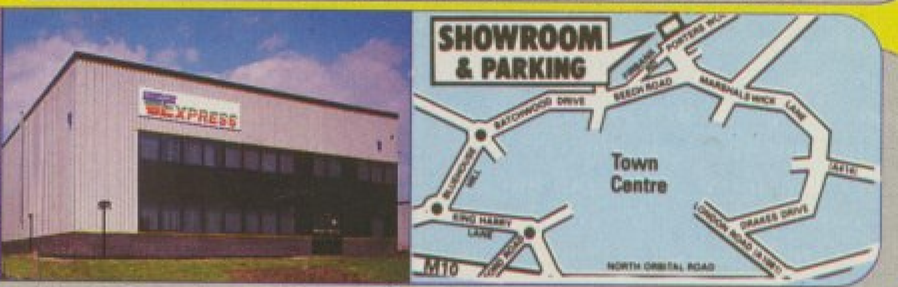
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Wired



DENISE makes wonderful music. She is the sound chip, but without an external amplifier of sorts you will be unable to hear a single thing.

Users lucky enough to have a stereo monitor (yes, Green, very good, you can put your hand down now) will know the benefits of playing Led Storm in full stereo. The remainder of us can either hum to ourselves or fashion a cunning lead to connect the Amiga to the nearest hi-fi.

Once the computer is wired into the AUX/CD connection of your hi-fi you too can experience the full earth-shattering excitement of being attacked by missiles while playing Falcon.

Of course, to connect your Amiga to a hi-fi you need to have a hi-fi nearby. If you don't own a suitable music system (shame on you – how can you listen to Pink Floyd?) you are stuck. Until today, that is. For now Green and I proudly present the Amiga Computing Stereo Amplifier Project, a small box which provides two watts of sound – twice that of the Commodore stereo monitor (so hah! Green).

The two watt amplifier is housed in a small box which connects directly to the back of your computer and to a set of small speakers, such as those supplied with a car stereo. (Please remember to ask permission before ripping the speakers out of the nearest car.) The unit can either be powered by a PP3 9 volt battery for total portability, or run from a suitable cheap mains unit.

Admittedly the total portability part is a bit of a con because you will still need to plug in the computer and monitor, but it sounds good. Total cost will be approximately 15 of your Earth pounds. The only snag is that you have to build it yourself. (But I am sure that if you were to send Green 50 quid he will build one for you.)

The recent advances in integrated circuit technology have not only made your incredibly powerful computer possible, but have made life a whole lot simpler for lazy electronic enthusiasts such as Green and myself.



for sound

What's this? What's this? Yes it is the two watt stereo amplifier from John Kennedy and Green

In the past, constructing an amplifier meant soldering lots and lots of transistors and things together. These days a single chip does all the hard work (except the soldering). All we have to do is put some resistors and capacitors around it to keep it company, give it nine volts and turn the volume up. Isn't modern technology wonderful?

Constructing the unit is not a very complicated task. All that is needed is some basic soldering skills, a strong desire to burn yourself and a free evening.

It should be noted that unless you try extremely hard indeed it would be impossible to damage the computer by plugging in this amplifier. Of course, if you do manage to destroy your computer – and believe me I'd have to see some pretty conclusive proof before I'd believe it possible – neither myself, Green nor *Amiga Computing* can be held responsible. In fact, there are few very responsible people here at all.

First get all the bits and pieces together and check that they are of the correct value (*A seemingly simple task which you totally failed to accomplish* – Green). All the parts are easily obtainable from a mail order company such as Maplins or Watford Electronics.

Most electronic magazines will carry advertisements for such companies, so its only a matter of nipping down to the local newsagent with a pen and paper. You could even buy a magazine if you didn't want to attract undue attention.

The parts list contains all the order codes for Maplins which is a reliable, friendly and efficient supplier.

Once you are sure that you have everything scattered all over the kitchen table you may start. First cut the strip-board to the correct size. It should be at least 24 holes by 24 strips, and small enough to put into

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Printing styles	bold, condensed, double strike, elite, italics, enlarged, pica, NLQ, subscript, superscript, microspacing, proportional spacing, any other printer fonts
Program mode	suppresses formatting; auto-indent; set tab stops
Proportional text	will print proportionally spaced, right justified text
Quick dictionary	dictionary held in memory is very fast
Ruler lines	any number of ruler lines to define document layout left/right margins and normal/decimal tab stops
Spelling checker	check whole text from disc or memory, or as you type. Suggests alternative spellings. Works with foreign languages
Symbols	full character set available on screen. Character symbols may be redefined
Time and date	time shown on screen. Insert time or date into document
Tutorial files	help you to start using Protext
Two file editing	two documents in memory, copy text between them
Typewriter mode	direct printing for envelopes etc.
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the plastic case you bought to house the unit.

Cutting the circuit board can be done either using a hacksaw or scoring it with a sharp knife and snapping it. The tracks to be broken should then be drilled or scraped away throughly.

It is, of course, a lot easier to cut the tracks at a hole in the board – a sharp craft knife should do the trick nicely. Examine the cuts very carefully and make sure that not even the tiniest contact remains.

It is a good idea to check now that the cuts are in exactly the right places, as mistakes can easily be corrected at this stage but become horrific and possibly expensive when you have already started soldering the components.

Now switch on the soldering iron. Soldering is a skill that takes little time to pick up, but a lot of practice to do well. However, doing it well is not necessarily essential; it just makes things easier.

Solder the IC socket into place, as this provides a useful reference point for all the other components. Next put in the wire connections. Only strip the very ends of the wire and leave the rest of the plastic sleeving on to avoid the possibility of short circuits.

The resistors can then be soldered into place. They do not mind which way they are connected, unlike the capacitors, which are next. These usually have a dark stripe with a white minus signs drawn down one side. The leg nearest this stripe can safely be taken to be the negative (-) side. In our circuit the negative side of the capacitors is always connected either to ground or to the loudspeakers.

The components used in this project are not very susceptible to thermal damage so don't worry too much about how long you spend soldering them. This was the main reason for putting the chip in a socket – you never have to solder it directly.

Once all the components have been soldered in place, cut some short lengths of wire and connect up the phono sockets, jack sockets and potentiometer. Remember to tin the wire before soldering to the main board by getting a blob of solder on the end of the iron and dipping the wire in to coat it. Try to avoid the cat when you shake the excess on to the lino.

The battery clip and switch

►

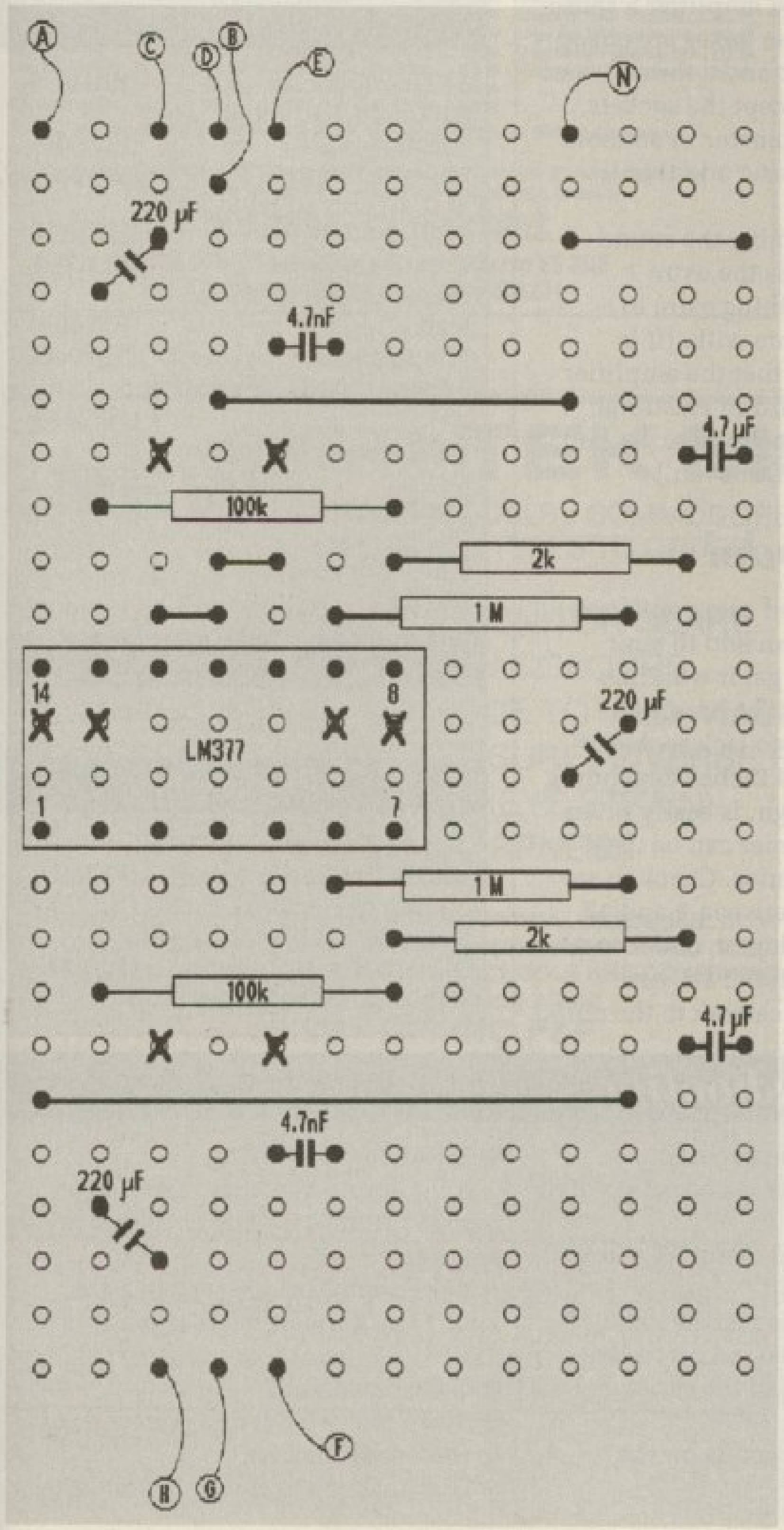


Figure I: Vero board layout – the copper tracks run vertically. X indicates a cut in the track

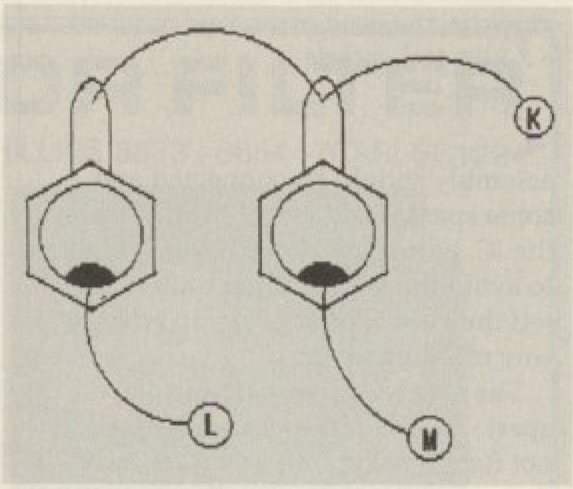


Figure II: Phone inputs sockets

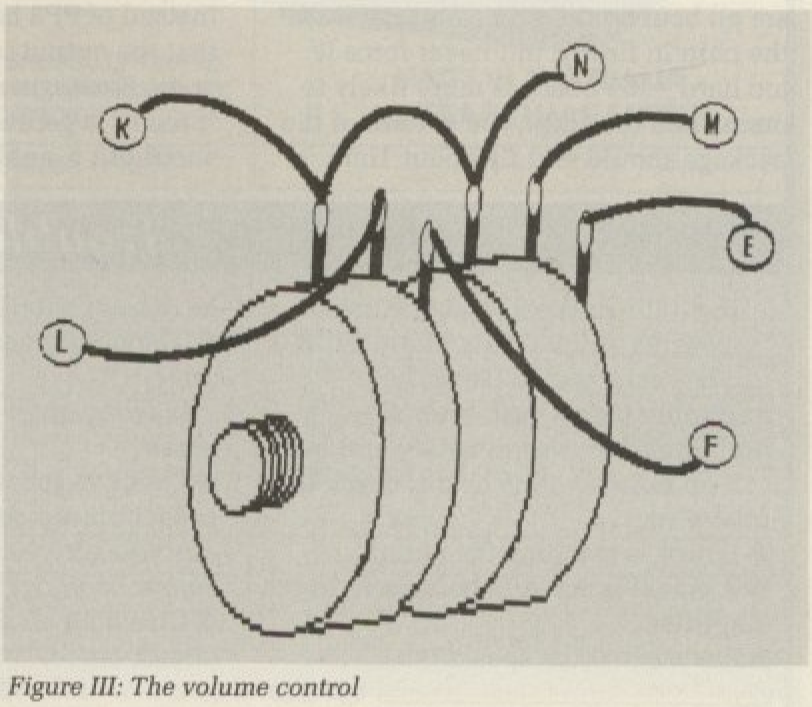


Figure III: The volume control

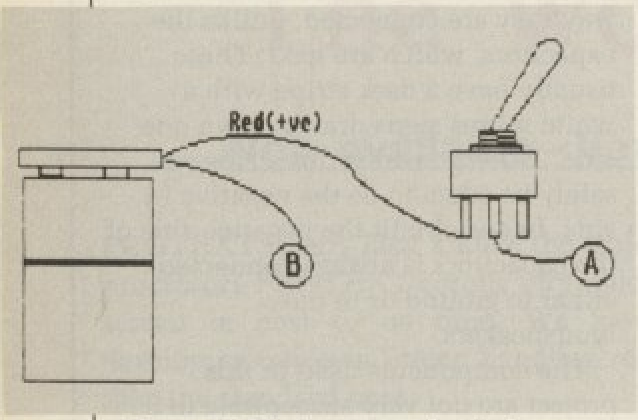


Figure IV: The battery and switch

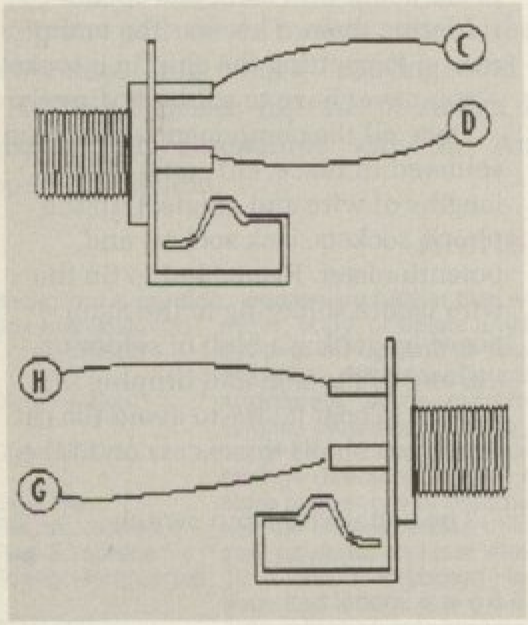


Figure V: The speaker outputs – 3.5mm jack sockets

◄ assembly should be connected and some speakers attached. Next plug in the IC. Extra care should be taken here to avoid the legs bending underneath – if they break off there is no reliable way of fixing them.

The legs are usually quite splayed apart – useful for direct soldering but not for insertion into a socket. Bend them on a flat surface to ensure they are all bent by the same amount. Push the chip in firmly, but never force it too hard – the board is more likely to break than the chip. The bottom of the package should end up about 1mm clear of the socket.

Turn the volume control to low or halfway and connect the battery. Flick the switch a couple of times. If all goes well you should be able to hear a slight hiss, the volume of which is controlled by the knob. If you hear a howling or whistling sound switch off and check the circuit carefully (see trouble shooting).

Assuming everything is functioning normally, switch off again and connect the computer. Boot up some good music, such as the cover disc demo. Switch on the amplifier and boogey on down!

Finishing touches

SMALL plastic boxes give your lovingly constructed amplifier a sense of importance. These boxes are cheap – usually about a pound a throw – and can be drilled to accept the sockets, switch and potentiometer. A suitable knob and some letraset add that professional finish.

Remember to number the sound level from 1 to 11, as the extra 1 provides that something extra to annoy the neighbours with. (It is extremely unlikely that the amplifier will actually be heard in Australia, but we must do something to get out own back on Jason Donovan.)

Deluxe model

GREEN has designed some optional extras which you can add to your amplifier once you get it working. Simplest is a socket for personal headphones. A stereo jack socket of either 3.5mm or 1/4 inches depending on headphone design, is easily fitted.

A mains transformer can be used instead of PP3 batteries. Check to see that the output is between 9 and 12 volts. If using an adaptor, check to see if the IC is getting hot. If so, you should fit a small heatsink to the chip.

Amiga Stereo Amplifier component list	Maplin Order Code
Resistors (0.6 watt should suffice)	
1Mohm x2	(M1M0)
2Kohm x2	(M2K0)
100Kohm x2	(M100K)
4K7 Lin dual pot	(FW84F)
Capacitors (radial electrolitic, rated approx 16 volts)	
4.7uF x2	(FF03D)
220uF x2	(FF13P)
4.7nF x2	(WW20W)
Semi-conductors	
LM377 Stereo Amp	(QH38R)
Misc	
14 DIL IC socket	(BL18U)
2.54mm (.1in) pitch stripboard (at least 24 strips by 37 holes approx)	(FL08J)
Battery clip suitable for PP3	(HF28F)
Connecting wire	(BL07H)
Stereo phono to phono lead	(RW50E)
Phono chassis socket x2	(YW06G)
3.5mm chassis jack socket x2	(HF78K)
Sub. min. SPDT toggle switch	(FH00A)
Knob	
Plastic case	
Holes (for case)	
BluTack	
Speakers	
2Watt, 8 Ohm Speaker x2	
Optional extras	
3.5mm chassis stereo jack socket (for headphones)	(FK03D)
3.5mm chassis jack socket (for external power supply)	(HF78K)
9V Power supply	(XX09K)
Heatsink for amplifier chip.	

Trouble shooting

THE circuit and construction are reasonably simple. Any likely faults can be easily traced using the minimum of test gear, a small multimeter or even a battery and bulb.

If no noise at all is heard, check the following:

- Power is reaching the circuit.
- A signal is actually being sent to the amplifier.
- Ensure that the speakers have been wired up properly.
- The potentiometer is correctly wired up.

If a very quiet and distorted sound is heard:

- Check to see if the resistors and capacitors are positioned correctly. Are you sure you read the resistor colour code right?
- Check for short circuits on the circuit board.
- Check for bad wiring.

If the sound becomes distorted at higher volumes try larger, higher rated speakers.

If the sound is loudest when the knob is at 1 and quietest when it is at 11:

- Get a new knob.
- Swap the two outside connections to the potentiometer.
- Don't ask me to solder the circuit.

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20 MB PC Hard drive + XT-Gen Controller	£169.95		

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23 pin D- Type Hoods	£ .99		
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Amstrad CPC	6179	6180	6181	6182	6183	6184
BBC Micro/Electron	2239		2242		2245	
BBC B+/Master 40T		2240		2243		2249
BBC B+/Master 80T		2241		2244		2250
Atari ST		9192		9193		9194
Amiga		9842		9843		9844
PC 5.25"		5764		5765		5766
PC 3.5"		5767		5768		5769

* released 14.11.89

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☐ Please debit my Access/Visa card no.

Expiry date ___/___

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Reach for the sky

Win a trip in a Cessna with Digital Integration



FLIGHT simulation is just that – a simulation. Nothing a computer generates can compare with the nervous, pit of the stomach feeling as you rush along the runway. The sense of freedom and elation as the wheels leave the tarmac or the incredible panoramic views you get from 5,000 feet.

Digital Integration realises this and tries its very hardest to produce accurate flying simulations. But for one lucky reader the company will go one better and let you take a couple of friends up for a trip in a Cessna light aeroplane.

Twelve runners up will get the chance to gen up on the plane which stars in F-16 Combat Pilot, DI's latest chart topper. F-16 Fighting Falcon is a book which details the different models and who uses them. Runners up each receive a copy.

The plane is beckoning, but you've got to win it to be in it. So here goes. Chocks away, answer three questions about DI and then scramble for the letterbox. A look at the review in the September issue might help.

❶ The aim of F-16 Combat Pilot is to hone your skills in all of the aeroplane's roles and then fly a mission which makes the most of these. What is the operation called?

a) Operation Wolf
b) Operation Conquest
c) Operation Overlord

❷ The game features many of the weapons an F-16 can carry. What is the night vision system called?

a) Lantern
b) A box of carrots
c) Richard

❸ For your trip in a Cessna you can take two friends. This would be a bit a squeeze in a fighter. How many seats does an F-16 have?

a) One
b) Two
c) Four

COMPETITION RULES:

(1) The first correct entry drawn out of the box on January 20 will win a trip around the clouds.

(2) Twelve runners up will receive a copy of F-16 Fighting Falcon by Peter Foster.

(3) You may not photocopy the form. Only genuine entries are acceptable.

(4) Employees of Database Publications and its associated companies may not enter.





F-16 Combat Pilot scored 97% in the September issue

I have read and understand the rules

....(sign here)

....(date)

1 ☐ 2 ☐ 3 ☐

Send your entry to:
Go fly with DI Competition,
Amiga Computing, Second Floor,
North House, 78-84 Ongar Road,
Brentwood, Essex, CM15 9BG.

Name ....

Address ....

....

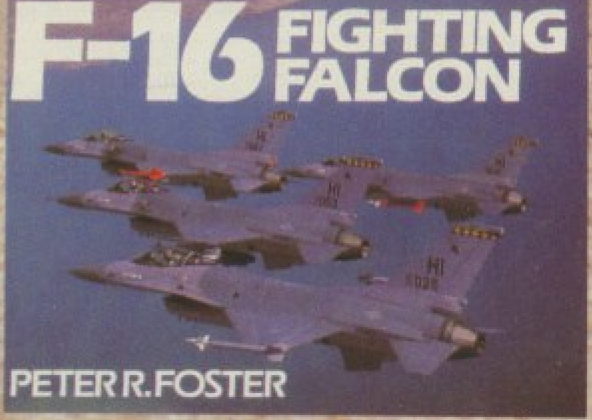
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Post code ....

Telephone:..



Announcing PRODATA – the Arnor database

Software for the 1990s

Arnor, the makers of PROTEXT, are pleased to announce the arrival of our complementary database program, PRODATA.

This is the program that our customers have been requesting for years. Prodata is an ideal companion to Protext - it uses the same key strokes and many of the same concepts, so Protext users will immediately feel comfortable. Prodata offers the same standards of ease of use and flexibility as Protext.

But you do not need Protext to use Prodata - it is a powerful database manager in its own right, ideal for all your filing applications. The program uses a simple set of menus which may be used with the keyboard or a mouse, as required.

Prodata is available now for the IBM PC and compatibles, Atari ST and Commodore Amiga computers.

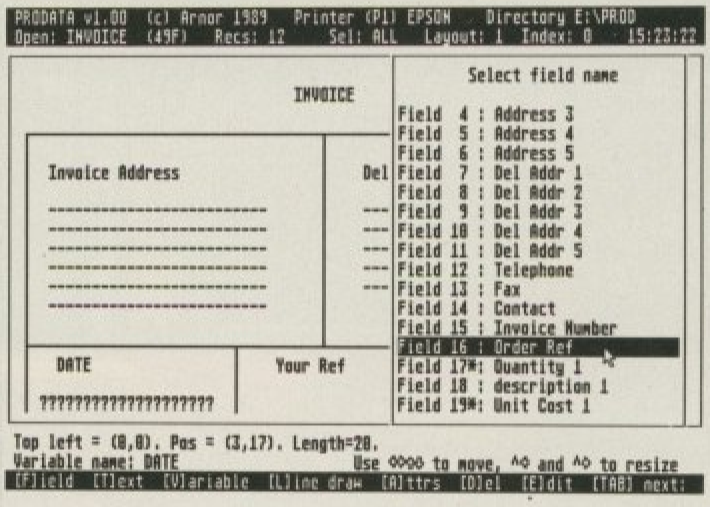
Amiga owners please note that you need 1MB to run Prodata - see below for special price for Prodata plus A501 (512K memory + clock expansion).

Prodata is exceptionally versatile:-

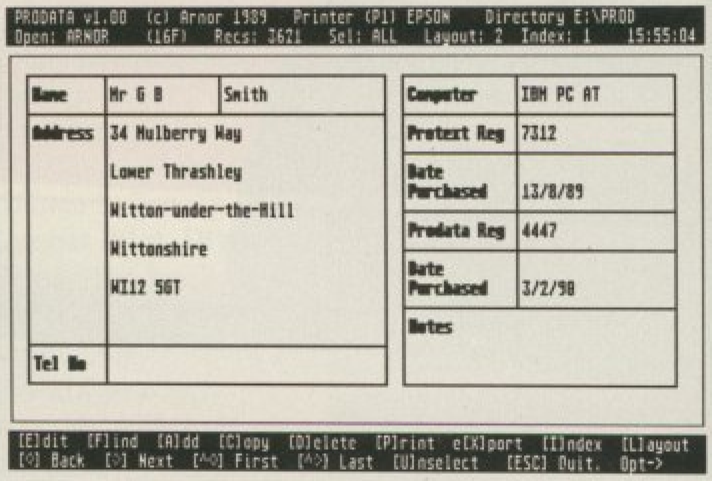
You can keep data files which are automatically sorted as you add information. The type of data can be very varied, ranging from simple names and addresses to inventories and catalogues and even invoices and records of transactions.

You can keep the data sorted in several different ways, e.g. by name, number, date. Almost instantly find information using any of these sort keys.

You can design different ways of presenting the data, e.g. straight list, address labels, tabulated data.



Designing a new layout



Displaying and entering data

Using Prodata is simplicity itself :-

All facilities are accessed from a few simple to use menus. To set up a new database file you merely need to enter names for each data field - you need not concern yourself with the size of fields or the type of data to be stored or even the total number of fields.

Variable length fields, up to 300 fields per record. Data files automatically extended as data is entered. Extra fields may be added at any time.

Indexed files may have up to 5 indexes, which may use supplementary sort fields. Instantly switch indexes to change sorting method.

Flexible layout design includes field, text and variable items, line drawing mode for boxes, layouts wider and longer than screen sizes with automatic scrolling, formatting of items (decimal places, justify, centring), printer attributes (bold, italic etc) both global and on each item, special 'attach' attributes to join items. Duplicate layout facility. Up to 100 different layouts.

Printing. Comprehensive set of printer drivers, full use of printer control codes, options to set all margin sizes, headers and footers, microspacing used to give correct output in proportional fonts, background printing, print to printer or to a disc file.

Filtering of data using any expression, Filters stored with descriptions, selectable from menu. You can instantly switch between displaying all records, those selected, or others. Individual records may be de-selected after filtering.

Importing and exporting of data in different formats suitable for other software including Protext. Selective importing allowing data to be checked and altered as it is imported.

Undo changes. The most recent data changes / deletions / insertions are logged and may be reversed to allow you to correct mistakes easily.

Password protection. 5 levels, ability to protect individual layouts to restrict access to sensitive data.

File management screen with directory map, rename, erase, copy, type, attribute display and alteration.

Powerful expression evaluator provides date calculations, substrings, conditional expressions, rounding. The result of an expression can be assigned to a field throughout the database.

Data entry verification. Fields may be required to be integer, number or date within a given range, or a string subject to a maximum length and mask.

Data editing with ability to duplicate an existing record, insert and overwrite mode, insert and delete line that automatically move fields up or down, swap characters, convert to upper or lower case, change layout or index from display mode, finds individual record almost instantly.

International compatibility includes full use of accented characters including correct sorting, keyboard configurable to 10 different national layouts, printer drivers supplied to print special characters.

Menu driven. Simple, easy to use system of menus and pop up windows. Keyboard or mouse may be used.

Plus macro record mode, batch delete facility, configuration pr_gram, example data files, on screen indication of bold, underlining, italics, comprehensive 190 page illustrated manual.

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Forty meg takeaway

Simon Rockman discovers that 20 minutes after playing with one hard disc you want another one

WHEN I grew out of short trousers and old enough to be told the evils of the world, Mrs Tyler, my computer science teacher, let me in on the secret of computer jargon. I'll share it with you.

Everything has three names: The British name, the American name and the IBM name. While IBM hasn't declared UDI yet, it is a xenophobic, autocratic state.

The peripheral most Amiga owners lust after is a hard disc, which some call a fixed disc and to which IBM have attributed the name Winchester because that is where it was invented. Seeing as they did the inventing I suppose they can call it what they like, but the other names are more meaningful.

The "hard" part of the name means that unlike a floppy the magnetic coating is spread over a solid disc. The heads which read and write to the disc don't touch the surface, as they do on a floppy, but float less than a hair's breath above using the effect of magnetism to transfer the data.

A hard disc spins very much faster than a floppy and has a larger diameter, meaning data can be packed more closely together resulting in much higher storage capacity. The result is that data can be read and written much faster.

The name "fixed" reflects the fact that hard discs cannot usually be removed; they stay fixed inside the machine, which means that when the disc is full you have to delete something to make room for more. Since 5 meg and 10 meg systems are rare, you usually have at least 20 meg to play with. The Amiga can cope with more storage capacity than most people can afford.

ONE of the reasons a fixed disc is fixed is because it works in a partial vacuum. The disc and the read/write heads live in a clean atmosphere, safe from all the nasty things which could damage their fragile co-existence. Things like particles of cigarette smoke and dust.

Panther Peripherals is importing the Syquest disc, which is hard, but not fixed – it's a *removable* hard disc (RHD). This offers the speed and capacity of a normal hard drive, but when it is full you just slot in another cartridge. And with 45 megs on tap you would only need a few RHDs to hold the entire Fred Fish collection. The best of all worlds?

Well yes, but because the disc needs to be slotted in and out, the drive cannot be a sealed unit. This leaves room for microscopic nasties to creep in. There is also the standard problem with Amiga hard discs: Price. The unit I tested with cables and one cartridge sells for £1374.25.

The expense doesn't end there. It needs a SCSI (pronounced scuzzy) interface. There are several for the A2000, but only one for the A500. Such a device will set you back about £200. Extra RHD cartridges cost a further £99.

But at least after having laid out all that money the thing is simple to install. It was supplied for review with a floppy boot disc, although it will autoboot under 1.3. The provisional documentation contained all the facts about altering your Mountlist and Startup-Sequence to include the new peripheral. You'll have to be au fait with the chants needed to get a hard drive running, but all the basic info is there.

Unless the cartridge is in the drive the system will not boot, something I found a little hard to handle after

▶

being brainwashed into removing floppies before powering on and off. The cartridges, like floppies, can be write protected – an insurance against virus paranoia, but not much use on this kind of medium.

The great advantage of a hard disc is speed. And one of the great failings of the Amiga is slow floppies. Copying a 1.6 meg file from one area of the RHD to another using Workbench 1.3's fast filing system took 190 seconds. This may not look too impressive compared to data transfer rates quoted on a manufacturer's spec sheet, but it is sensibly fast.

When you walk along the Amiga upgrade path a monitor improves the results, a second drive makes the machine easier to use and extra ram means you can do more, but a hard drive transforms your Amiga, being the ultimate peripheral in many users' eyes – really worth saving for.

And while I'd advise anyone to pawn their football boots or sell their younger brother to slave traders to buy a hard drive, I'm not so sure I'd recommend this particular one. Firstly it is twice the price of its rivals. Secondly, it went wrong.

While copying a large file it produced a read/write error. This error grew until the unit failed to boot. While you can throw away the odd duff 3.5in disc, a £99 cartridge is not something you want to give to the men who spread old newspapers over the garden path every Wednesday.

BESIDES, backing up on to 50 floppies before you bin the cartridge is more boring than your average BBC computer programme. The ideal situation is to have two RHD drives and use one as a backup, but you would have to be a really heavy user to justify that kind of expense.

The system is worth looking at if you do a lot of video work and have large .anim files to save, or if you want to hold a library of shapes for Sculpt 3D.

But for the majority of Amiga users it is a no-no. In the light of the read errors I suffered I wouldn't even advise buying the Syquest as a second drive for backing up a hard disc. A tape spooler would be a better bet.

REPORT CARD

Syquest Hard Disc
Panther Peripherals 01-446 8431
£1,200 approx

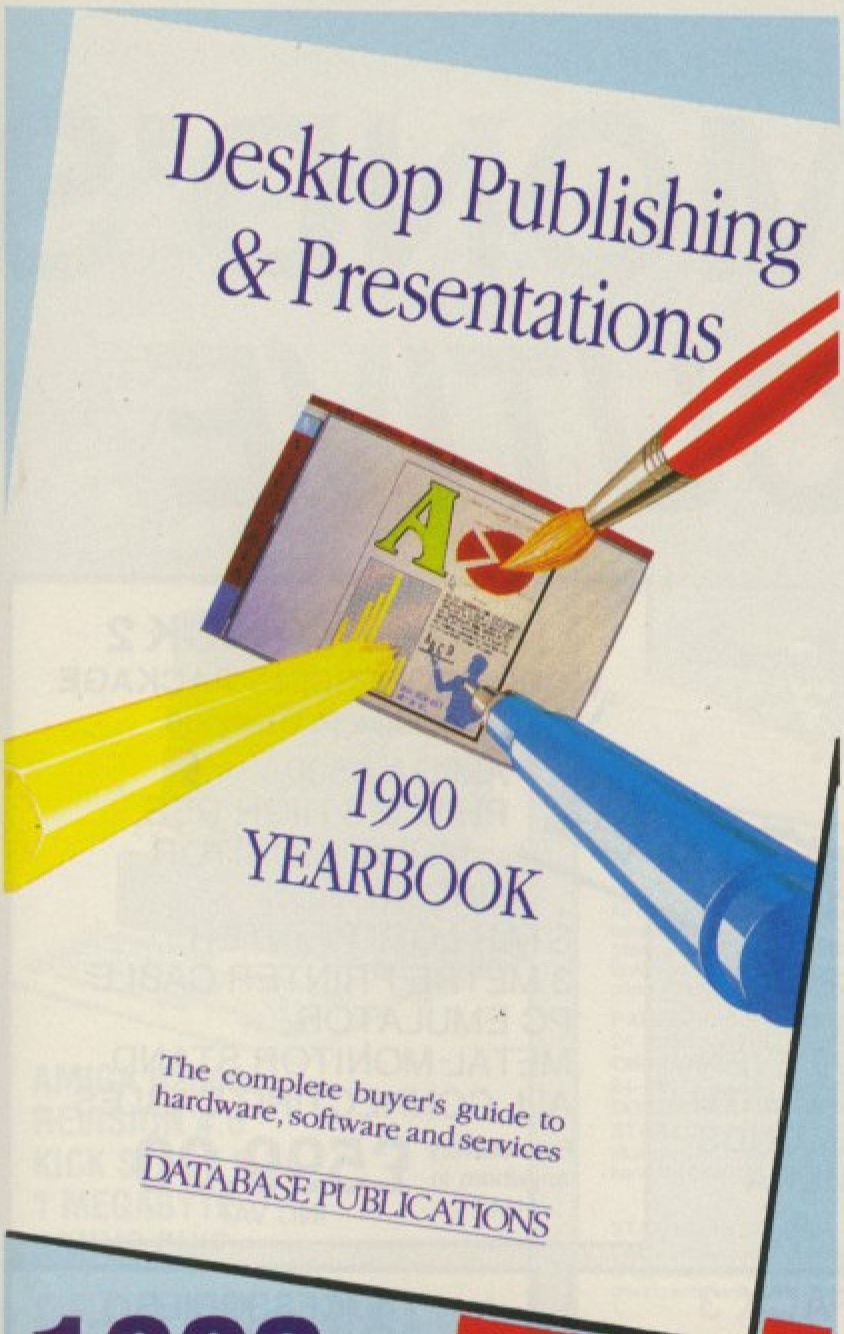
EASE OF USE..........
Perfectly integrated into AmigaDos but needs a third party SCSI interface and has reliability problems.

SPEED....................
Quick enough to transform your system but does not rival similarly priced fixed drive in terms of performance.

VALUE...................
Syquest cut its teeth in the Mac market and priced the drive to suit a £2,000 computer.

OVERALL **59%**

This is a pointer to the future. We will all have hard discs in a couple of years' time. Removable discs can wait until the mid 1990s.



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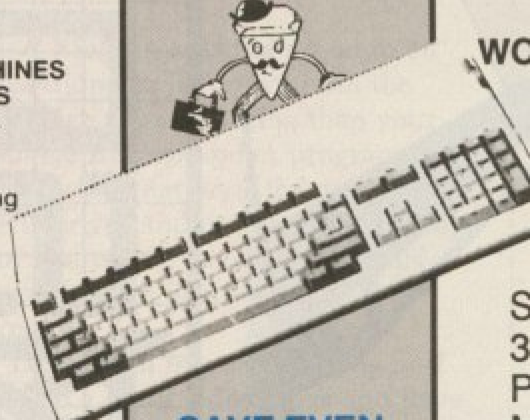
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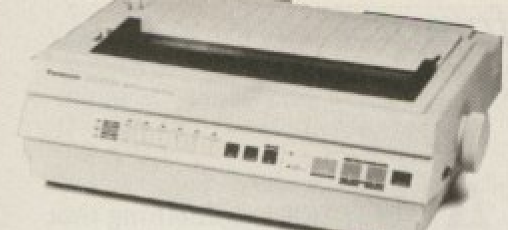
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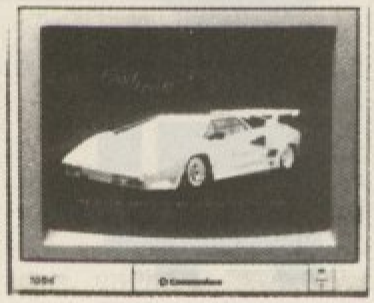
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A blit on the side

Shuffling data around memory is what computers are good at. Jolyon Ralph shows you how to use the chip that made the Amiga famous

A BLITTER is something that blits. Blit stands for BLock Image Transfer, which essentially means taking a rectangle of screen data and pasting it somewhere else on the screen. Commodore initially tried to call it a bimmer (for Block Image Manipulator) but that was such a stupid name that no one else used it. Eventually Commodore forgot it as well.

The blitter chip doesn't do anything that can't be done with the processor, but it can do it a heck of a lot faster. In its simplest method of operation – a straightforward data copy – it can move over 15 million pixels a second.

But the blitter inside the Amiga is much more versatile than this. It can perform logical operations – so it can mix the blitted data with the data currently on the screen in various different ways – and it can draw lines and fill areas.

It is also not confined to working with graphic memory and can be used on anything residing in chip ram. Decoding raw data read from the disc drive is one task the blitter is put to by the Amiga.

Block image transfer is only one small part of what the Amiga's blitter can do.

Like almost every other part of the hardware, the blitter uses Direct Memory Access (DMA) to perform its electronic miracles. As with bitplanes and sprites, all you do is tell it what to do and start it off, then you can forget about it while it happily blits away in the background.

The blitter uses four DMA channels. Three of these are inputs called A, B and C, which take data from memory into the blitter, and there is one output from the blitter back to memory, called D. You can use three, two, one or even none of the inputs at a time by disabling the DMA channels that are not needed. There are even times when you may want to disable the output, channel D.

To use the blitter you have to set up the various hardware registers which tell it exactly what you want to do. First check that the blitter is not already busy – especially important in multi-tasking programs.

Remember that the blitter is used by the operating system for all sorts of unusual purposes and changing blitter registers while it is busy is rather like trying to put a load of dirty clothes in a washing machine while it is half way through running another wash. All you end up with is a spectacular mess.

To see whether the blitter is busy you must test bit 14 of the hardware register $dff002. To make it simple, use the little loop below, it will wait until the blitter has finished before carrying on with the program.

```
blitchek:
  btst #14,$dff002 ;Is blitter busy?
  bne.s blitchek ;If not, loop back.
```

After executing this you can safely set up the blitter for your own use. Firstly, set the DMA pointers for the blitter I/O channels. You only need to set the channels that you are using. Next you must tell the blitter about the rectangle you want to blit and where you want to blit it to.

To work out how to set aim for a particular rectangle you must understand how the Amiga's screen is laid out.

A standard lo-res bitplane consists of 200 horizontal lines of 320 pixels each line. This is stored in memory as a block of 8,000 bytes, where each line is stored as 20 words.

The blitter, which must be told where the image you want to move is in memory, works by moving a word at a time, so you can only move to and from even word boundaries.

The blitter window is defined in a similar way to a bitplane (see Figure I). As with bitplanes, you can set a modulo for each DMA channel which will skip a set number of bytes at the end of each line. This is important if the area you want to blit is not the full width of the screen.

The modulo is the value added to the blitter address registers after each line of the window is read. To calculate the modulo you need to take

the width of the screen in bytes, remembering to add on any bitplane modulo (if you have set one) for the off-screen bytes, and subtract the width of your blitter window in bytes. This is the value you should use for the blitter modulo.

The next thing to set are the registers called BLTAFWM and BLTALWM, which stand for Blitter A channel First Word Mask and Blitter A channel Last Word Mask. If the area you want to blit does not start or end horizontally exactly on a word boundary, you can mask off the unwanted area at the sides of your blit area to make up the area to word boundaries.

If the first word mask is set to $ffff (all bits set) the first word of each line will be printed normally. If the first word mask is set to $00ff, the first byte of each line will not be read but replaced with zeros in the blitter calculations.

Two control registers tell the blitter what sort of operation you want to perform on your data. As you probably suspect already, these control registers are fundamentally important. The makeup of BLTCON0 and BLTCON1 are shown in Figure II.

You tell the blitter which DMA channels to enable by setting the USEA to USED bits. Remember, the less channels used the faster the blitter will operate. For a straightforward data copy normally only A and D are used.

Bits LF7 to LF0 are called the minterms. They determine the logic operations that the blitter carries out on the data. Each of the eight bits determines whether a bit will be set in the destination or not. The panel below details what the eight minterms stand for.

LF7	LF6	LF5	LF4	LF3	LF2	LF1	LF0
ABC	*ABc*	*AbC*	*Abc*	*aBC*	*aBc*	*abC*	*abc*

A means the bit tested from source A is set, *a* means the bit tested from source A is clear, and the same for *B* and *C*. This means that if only LF7 is set, the destination from the blitter will only set a bit if the corresponding bits of A, B and C are set.

If you are using less than four DMA channels you will have to check for 0 or 1 in the unused channels. For

00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99

An example of a blitter rectangle defined as part of a 20 word wide bitplane. Numbers are words offset from START, the start of the bitplane.

*In this example, assuming the window was used as the A source, BLTAPTR would be START+46 (2*23). There are 11 words between each line of the blitter rectangle, so the blitter modulo, BLTAMOD, would be 22. The blitter window is 9 words wide and 3 lines deep, so the correct value for BLTSIZE would be 9+3*64, or 201.*

BIT	BLTCON0 ($dff040)	BLTCON1 ($dff042)
15	ASH3	BSH3
14	ASH2	BSH2
13	ASH1	BSH1
12	ASH0	BSH0
11	USEA	unused
10	USEB	unused
9	USEC	unused
8	USED	unused
7	LF7	unused
6	LF6	unused
5	LF5	unused
4	LF4	EFE
3	LF3	IFE
2	LF2	FCI
1	LF1	DESC
0	LF0	LINE

Figure II: Makeup of the BLTCON registers. Note: EFE/IFE/FCI and LINE are for blitter line drawing (not discussed here) and should be set to zero.

NAME	ADDRESS	SIZE	COMMENT
DMACONR	$dff002	.W	Bit 14 - blitter busy
BLTAPTR	$dff050	.L	Address for DMA A (source)
BLTBPTR	$dff04c	.L	Address for DMA B (source)
BLTCPTR	$dff048	.L	Address for DMA C (source)
BLTDPTR	$dff054	.L	Address for DMA D (destination)
BLTAMOD	$dff064	.W	Modulo for A
BLTBMOD	$dff062	.W	Modulo for B
BLTCMOD	$dff060	.W	Modulo for C
BLTDMOD	$dff066	.W	Modulo for D
BLTAFWM	$dff044	.W	First word mask for A only
BLTALWM	$dff046	.W	Last word mask for A only
BLTCON0	$dff040	.W	First blitter control word
BLTCON1	$dff042	.W	Second blitter control word
BLTSIZE	$dff058	.W	Width in words plus 64*height

Figure III: The blitter registers. Writing to BLTSIZE ($dff058) enables the blitter, so it should be set last.

►

example, if you want to set a bit when both sources A and B are set, but you are not using source C, you will have to set LF7 and LF6 (for ABC and ABc) so that the corresponding bit in the destination will be set whether the bit from C is set or not.

Most of the common minterms can be worked out like this. For a straightforward data copy – that is, *D=A*, destination taken straight from source A without alteration – you would only enable DMA channels A and D and you would set minterms LF7 to LF4.

The minterm value which you put into the BLTCON0 register would be $f0, taken from regarding LF7 to LF0 as binary digits. This will set the corresponding bit in the destination when A is set, regardless of the settings from the B and C sources.

If you want to use the blitter to clear an area of memory you don't need to enable any DMA sources, only the destination D. As you always want a zero to be written to memory, you don't enable any minterms, so the minterm value is $0.

If you want to copy from the A source to D destination, but only the bits where the B source is set as well – which is a very simple form of masking, defining a mask showing which parts of a picture you want transferred – you would use the logic operation *D=A AND B*. D is only set when both A and B are set. This would need just the minterms containing AB, or LF7 and LF6. The minterm value would then be $c0.

So far you can scroll smoothly vertically, as shown in the example listing, by moving the data to a position 40 bytes back in memory – 40 bytes is the width of a standard lo-res screen. You can use the same technique to scroll an area horizontally by 16 pixels, but you can't do smooth horizontal scrolling this way.

To do smooth horizontal scrolling you need to use the barrel shifter. This rotates the data held in the blitter by up to 15 pixels at a time. The highest four bits in BLTCON0 determine the horizontal shift for source A, and the highest four bits in BLTCON1 are for source B.

Note that all shifts are to the right, so if you want to scroll smoothly to the left you will have to scroll roughly by one word to the left and scroll smoothly to the right by however many pixels you need to make up to the position you want.

The bits EFE/IFE/FCI and LINE are for using the blitter to fill areas and draw lines. This is beyond the scope of this article. If you want to investigate these areas you should

read the Amiga System Programmers Guide by Abacus.

Don't use the old Addison-Wesley Hardware Reference Manual for this – it has several serious mistakes in the blitter line drawing chapter which will cause severe problems for anyone trying to master the blitter. The new Hardware Reference Manual is in the shops. I'll check it out and report back to you asap.

The last bit to talk about is DESC. This determines the way the blitter works. If you are copying one part of memory to another part and the two areas do not overlap you have no problems. However, if the areas do overlap you must make sure the blitter is working in the correct direction – that is, top to bottom or bottom to top.

IF not, the destination can write over the bottom of the source before it is used. Setting DESC means the blitter works backwards, so ensuring that it will not overwrite itself.

As a general rule, if the source and destination overlap, then set DESC if the destination is lower down the screen (higher up in memory), and clear DESC if the destination is higher up the screen (lower down in memory).

The example listing shows how to set up a simple blitter operation to move a block of memory – the middle of the screen in this case – up by one line (40 bytes, remember, because 40 bytes is a line in a lo-res screen). In this example, source and destination are overlapped, and destination is higher up the screen so DESC is 0.

● *NEXT MONTH: Let's write a demo!*

```
section blitter,code c          ; Put into chip memory.
 opt     c-,o+; No case sensitivity, optimize on.

        lea     gfxlib,a1
        moveq   #0,d0
        move.l  4.w,a6
        jsr     -$228(a6)       ; Open graphics library.
        tst     d0
        beq     error
        move.l  D0,gfxbse

        move.l  #screen,d0      ; Store screen address in
        move.w  d0,pl0l         ; copper list.
        swap    d0
        move.w  d0,pl0h

        move.l  gfxbse,a6       ; Set up copper list.
        add.l   #$32,a6
        move.w  #$80,$dff096
        move.l  (a6),oldcpr
        move.l  #newcpr,(a6)
        move.w  #$8080,$dff096
        move.w  #$8010,$dff09a
        move.l  $6c.w,old
        move.l  #new,$6c.w

wait:   btst    #6,$bfe001      ; Test for mouse button.
        bne.s   wait

        move.l  old,$6c.w       ; Return to workbench.
        move.l  gfxbse,a6       ; Copper list.
        add.l   #$32,a6
        move.w  #$0080,$dff096
        move.l  oldcpr,(a6)
        move.w  #$8080,$dff096

        move.l  gfxbse,a1       ; Close graphics library.
        move.l  $4.w,a6
        jsr     -$19e(a6)

error:  clr.l   d0              ; Exit routine.
        rts

new:    movem.l d0-d7/a0-a6,-(sp) ; Save all registers.
        and.w   #$10,$dff01e    ; Check if it is.
        beq.s   out
        move.w  #$10,$dff09c

        bsr     movbts           ; Enter a new line.
        bsr     blitit

out:    movem.l (sp)+,d0-d7/a0-a6
        dc.w    $4ef9                ; jsr instruction.
old:    dc.l    0

movbts: lea     endlin,a0            ; Move 40 bytes to
        addq.b  #1,bytval            ; bottom of screen.
        move.b  bytval,d1
        moveq   #39,d0
movlp:  move.b  d1,(a0)+
        dbra    d0,movlp
        rts

blitit: btst    #14,$dff002
        bne.s   blitit
        move.l  #screen+40,$dff050      ; BLTAPTR.
        move.l  #screen,$dff054         ; BLTBPTR.
        clr.l   $dff064; Clear BLTAMOD and BLTDMOD.
        move.l  #-1,$dff044; This moves $ffff into
                        ; BLTAFWM and BLTALWM.
        move.w  #%100111110000,$dff040  ; BLTCON0.
*
*                  /     /
*               %1001    /; %1001 = Enable A and D DMA.
*                     %11110000; Minterm val = $f0, D=A.

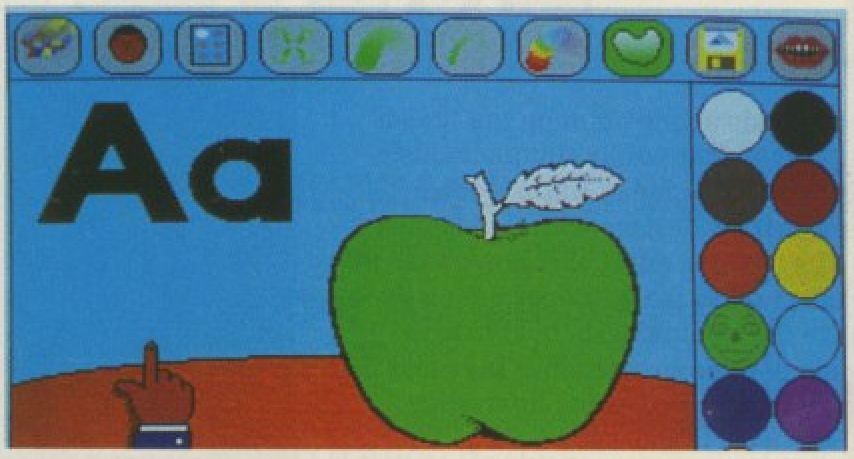
        clr.l   $dff042                 ; BLTCON1.
        move.w  #20+64*101,$dff058      ; BLTSIZE.
        rts

bytval: dc.b    0,0
oldcpr: dc.l    0                       ; Workbench copper
list.

newcpr: dc.w    $100,$1200,$102,$0,$104,$a,$108,0,$10a,0
        dc.w    $92,$38,$94,$d0,$8e,$7c81,$90,$e0c1
        dc.w    $180,0,$182,$fff,$e0
pl0h:   dc.w    0,$e2
pl0l:   dc.w    0
        dc.w    $e209,$fffe,$9c,$8010
        dc.w    $ffff,$fffe             ; End copper.

gfxlib: dc.b    "graphics.library",0    ; Library name.
        even
gfxbse: dc.l    0
screen: ds.b    4000
endlin: ds.b    40
```

Kiddie Paint



Art and the Amiga go together like Tom and Jerry, so what better way to start your children computing? Ian Hugo tries My Paint out on his kids

THEIR faces lit up. "Brill" and "Great" were the instant reactions to MyPaint, a paint program for kids from Prism. Three days later my children had stopped using it, which sums up the strengths and the weaknesses of the program.

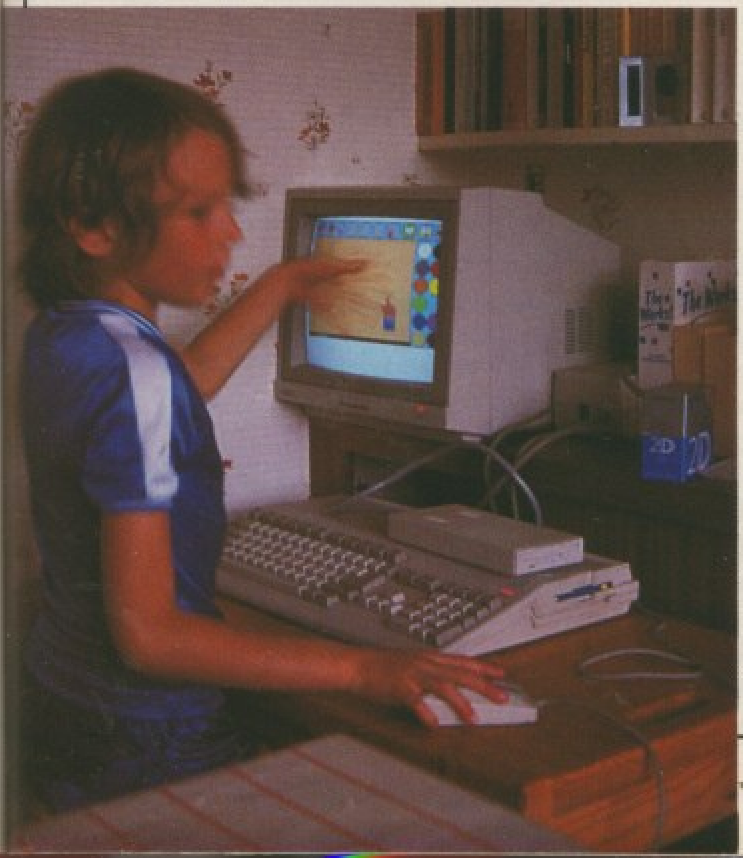
The disc arrived in an attractively packaged box boldly proclaimed to be "kid tested". "OK", I thought and, after looking to see that the program loaded properly, I left Carl, aged eight, and Natalie, ten, to get on with it.

Needless to say, neither started by reading the small book of instructions, and immediately hit a snag. The opening screen doesn't tell you what to do next. Neither does the booklet. Obviously, what you need is a surface to paint on; but how do you get one?

Fortunately, there is a big Help icon in the middle of the screen and they clicked on that. The program immediately started to step through each of the facilities shown and a Dalek-like voice explained what each did. That revealed that the disc icon was the one needed.

Shrieks of delight at this discovery but how could they stop Help droning on? It didn't seem that they could; so, heavy sighs while Help continued to the end of its routine.

Thereafter it was all pure delight. They started with the mystery feature, a gift box which you unwrap by rubbing over it with the brush to reveal one of the 28 drawings stored in the colouring book. Using the painting facilities was extremely simple, and they soon went through a variety of drawings each. They were genuinely pleased with the pictures and had a lot of fun colouring them in.



I insisted that they try out all of the facilities and it took a couple of hours for both to do so. They managed to make all the facilities work for themselves, apart from saving a picture. And then that was that; there was little more interest.

On offer are a thick and thin paint brush, an eraser, an "oops" facility, fill-in, mirroring effect, flashing effect, multi-colour brush and a sound effect, plus a dozen colours to choose from and, of course, the colouring book. Some facilities and effects worked better than others.

The paint brushes are adequate rather than good. My kids have been used to Photon Paint, with eight thicknesses of brush, and so were not very impressed. The same can be said of the range of colours – 12 is an adequate rather than a generous number, and there is no opportunity to mix new colours. As the program runs in low resolution (320 x 200) mode this is not due to memory restrictions.

The multi-colour brush has essentially the same effect as a multi-colour pencil; it's interesting for a minute or so.

The eraser is slightly disconcerting, since it erases all colouring on a drawing. That came as quite a shock when they tried it to rub out only part of their colouring. The "oops" facility undoes only the last brush stroke, so it's not very helpful when second thoughts occur slightly late.

However, it didn't take them long to work out that colouring in white would have the same effect as a more constrained eraser. Given the obviously intended market for the program, that might usefully have been spelt out somewhere.

SOUND effects were the least successful of the facilities. Clicking on it produced a noise related to the drawing currently displayed. The sounds were rather rudimentary, however, and their Dalek quality often required an effort of imagination to link them to the picture.

Mirroring on the other hand, was first class. It apes the effect of four mirrors, as though the screen were divided into four quarters, so that a

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mark made at one point on the screen appears at four points simultaneously. The kids managed to achieve some very striking designs with that facility.

The flashing effect also provoked some creative work. It does not really make the colours flash, but changes seven of them in rotation. This succeeded in suggesting interesting alternatives to the usual colours for the sky and grass.

The colouring book had the kind of range of pictures that you might expect to find in a child's colouring book or an ST owner's library – plenty of animals, country scenes, a zoo scene, a space scene, dinosaurs and boats.

The fill-in facility was just that but it did work commendably quickly, noticeably faster than it does in Photon Paint, not difficult since Photon uses HAM. Where young children are concerned, that is an important touch.

THE surprise picture facility held attention longer than I expected. They tended to use that rather than page through the book, using the simple back and forward arrows provided. It should be added, in passing, that it is possible to paint extra features over the drawings to be coloured.

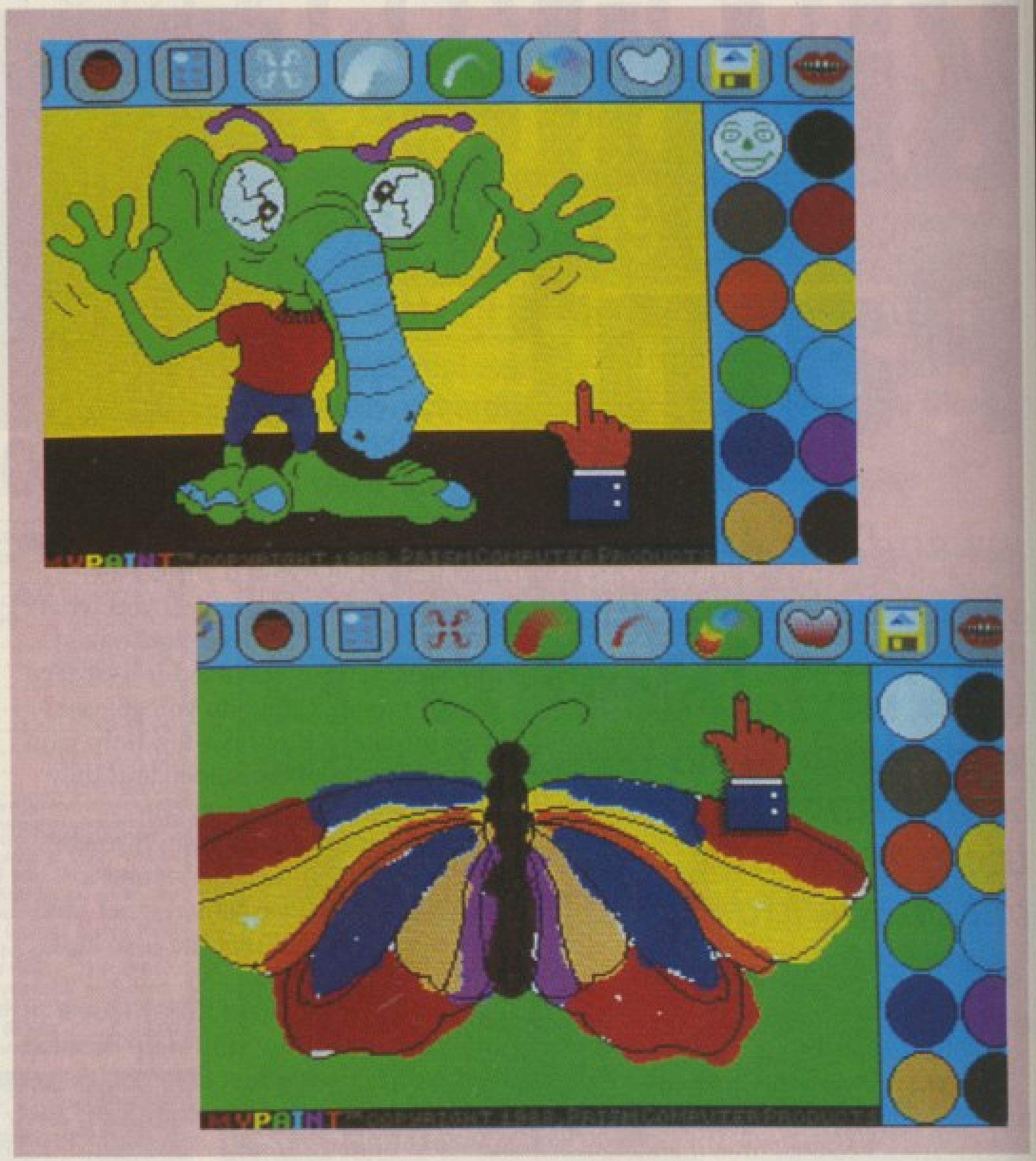
Probably the principal criteria in judging such a program is whether it can and will be used over a reasonable period by its intended market. Clearly, it is for very young children, but ones who, nonetheless can use a mouse and such conventions as clicking on a brush and a colour in order to paint.

A lot of thought has been given to making the facilities simple. All have clear icons except perhaps the disc icon which produces the painting surface.

An image of a painting book might have been better.

The booklet notes that children using the program may not be able to read, which is presumably why the Help facility not only explains each feature in text but also reads it to you. Still, it's a nice touch.

Documentation is basic. The booklet is for older children or adults who are lending a helping hand. It is simple and well laid out but has a couple of small glitches given the criterion of extreme simplicity. The "getting started" section doesn't really get you started, it just gets you to the opening screen, where you need Help.



Secondly, the section Quitting The Program cheerfully states "You may safely turn off your computer at any time within Mypaint to end the program". With the disc still in it? We didn't test this in case that proved to be the end of the test, but a young child might do just that.

A FINAL point is to consider what facilities might reasonably have been put into the program that weren't there. A paint mixing facility would have added a little more interest and it would have been nice to have a small library of common shapes so that children could compose their own drawings.

Essentially, what Mypaint gives you is an electronic colouring book with a few bells and whistles. I felt that Carl and Natalie were slightly too old for it – they tend not to use colouring books any more.

However, it does have "instant" appeal and could well be a very attractive program for a five or six year old, who would find a more sophisticated painting program too daunting but would need some help with this.

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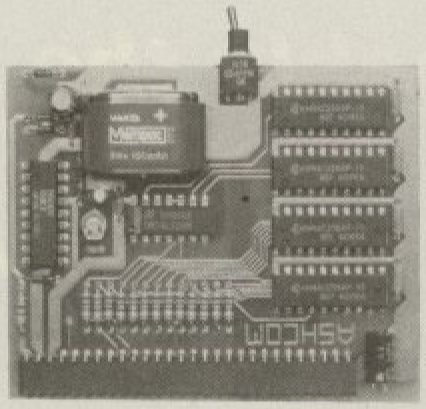
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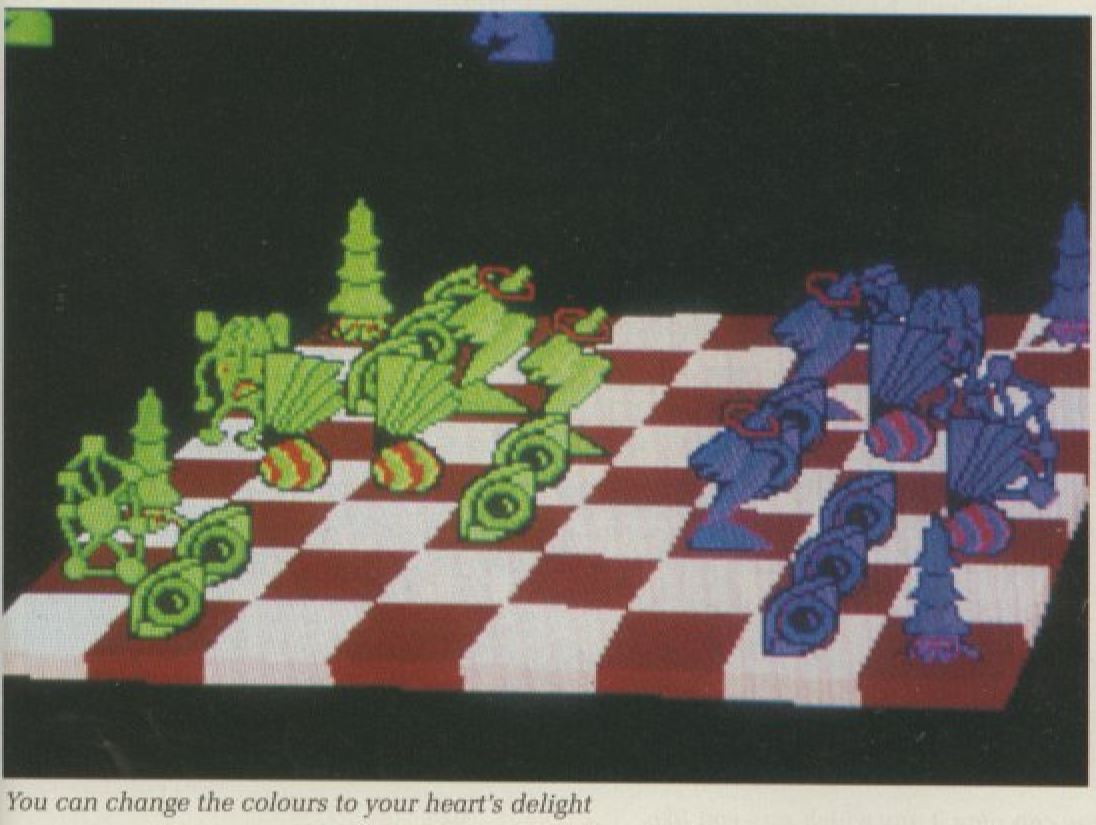
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The spacemen set can be fun for a while

Horsey takes king prawn

Alastair Scott pits his wits against the latest pretender to the Amiga chess crown



You can change the colours to your heart's delight

RIGHT from the start Oxford Softworks' Chess Player 2150 has unusual features. After negotiating the password protection scheme, you are given a very clear 2D board. Select the first menu item and the board switches to a 3D representation which is much better than those of Colossus Chess X and Chessmaster 2000.

Here there is no jerky piece movement, no doubt about whether one piece is passing in front of or behind another, and no question as to which piece or square is being pointed at.

Another advantage over the other programs is that the board can be rotated, shrunk or enlarged without perspective being distorted. The 2D board has only standard chessmen, the 3D board has an unusual choice of two Staunton sets, spacemen, farmyard animals or toys, the last two presumably for child appeal.

All choices are made from menus, with no Amiga key shortcuts. Requesters with buttons appear on screen when needed and filenames are chosen from a standard menu. Dialogue boxes are a little flickery.

I've Gurued a couple of times while replaying loaded games, and copies of the master disc occasionally have to be loaded twice before working properly. I found no other bugs.

YOU should have no problem in finding a suitable type of play from the five available. Firstly there is Weak Player, which has 10 sub-levels which force the program to play random but legal moves.

The other four are more conventional: Tournament allows you to enter a move time between one second and infinity, which the program will, on the whole, match; Average makes it take the same time over every move; Matching matches both players' times per move; Infinite

▶

makes it think until Esc is pressed.

In addition, Chess Player 2150 can be told to avoid draws at all costs, always play for the draw, or anything in between, and can be handicapped by being prevented from thinking in its opponent's time.

While a game is in progress you are free to select most menu items. Moves can be taken back and played forward, sides can be swapped, the program can play itself or monitor two human players.

There is some horrific Frank Bruno style digitised sound which will have you reaching for the menu to replace it with a bleep. The board colours can be changed.

It would have been helpful to be able to store such alterations in a preferences file, but no such option is available.

By selecting the menu option you can switch to the information screen, which shows moves made, time taken, depth of search and current line.

Chessmaster is still the only Amiga program which uses proper algebraic notation – Chess Player 2150 uses the unambiguous but ancient D1G4, F3D4 form. Hardcopy uses the same notation, but with the neat touch that the time taken for each move is printed beside it.

BUT Chess Player 2150 has features which set it aside from the competition. Provided a copy of the program disc is used, any unexpected moves can be added to the openings library.

Although the library is 93,000 bytes (not moves!) long, it has some surprising gaps. For example, *1.e4 d6 2.d4 Nf6 3.Nc3 g6 4.f4* takes the program out of book.

More important is the option which allows you to test both your playing strength and that of the computer at any skill level. This involves solving 24 chess problems by giving up to four possible moves for each at two minutes maximum per move.

The manual says this is enough to estimate a grading to within 50 points. While this is true for my grading – it overestimated by 35 points – I can't see how it can possibly work in all cases.

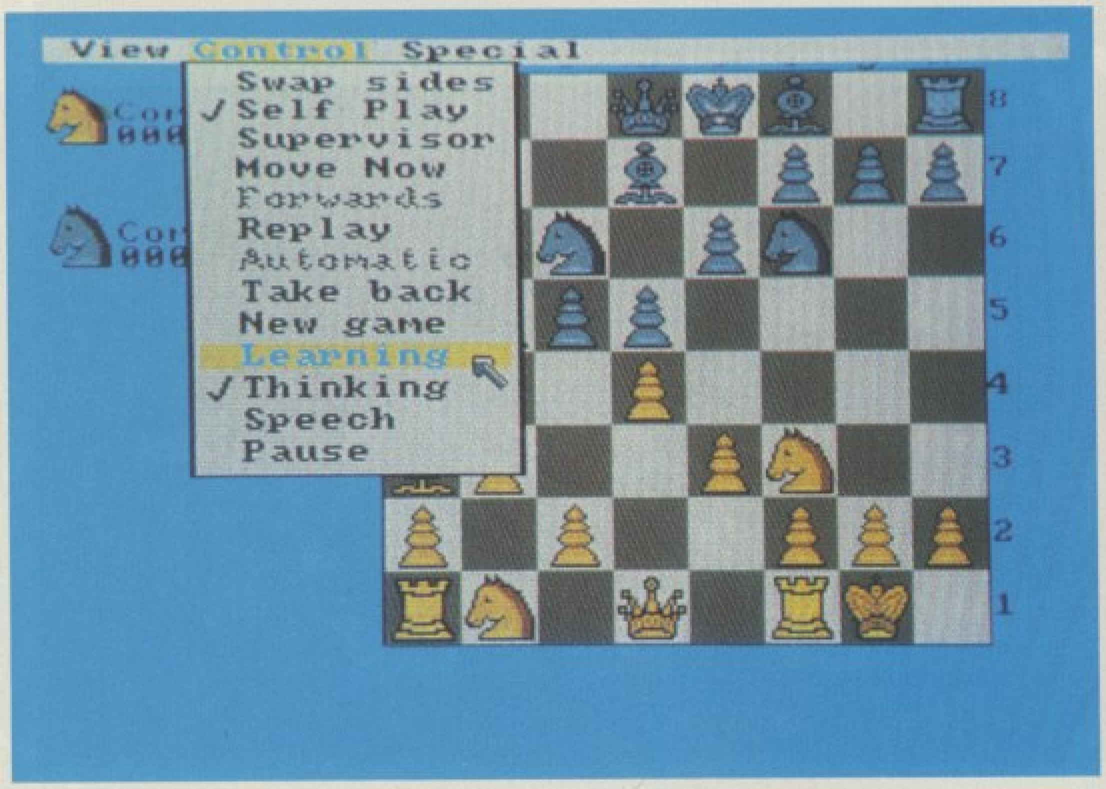
For example, computers and people have completely different methods of tackling chess problems. People are analytical, computers are more brute force and ignorance. Giving the same test to both seems unjustifiable. I would be very wary of reading anything into results obtained with it.

There is no substitute for safety in numbers – many games against many graded opponents, both computer and human, together with a mathematically sound method of grading.

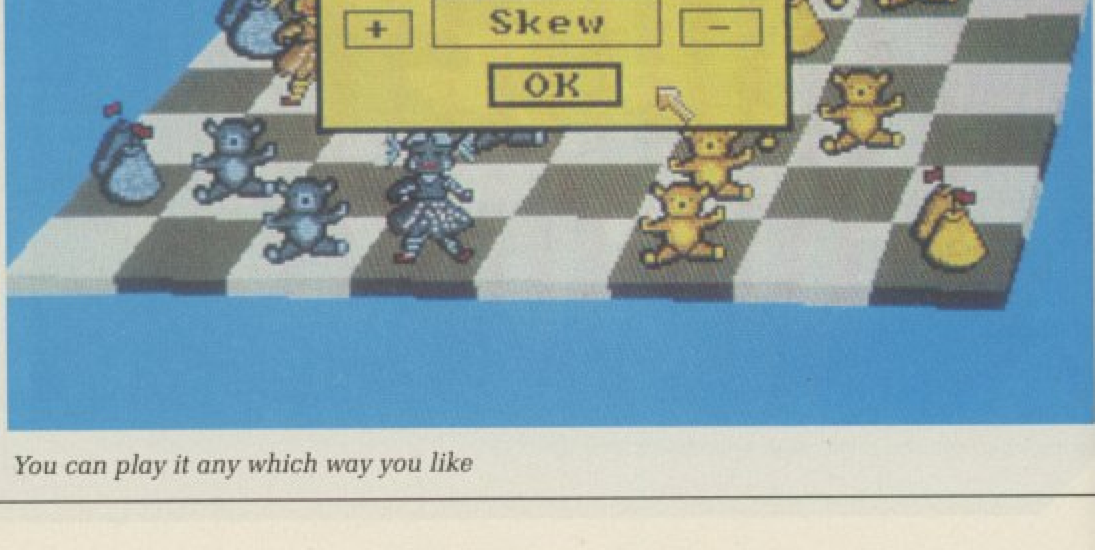
The final curiosity is What If? This allows you to search the tree of moves and find out why the program rejected a line of play, possibly forcing it to play that line and see what happens.

This option was put in at the development stage and tidied up for the release version. Although difficult to use, it does give you a feeling for what goes on behind the fancy graphics.

CHESS Player's playing strength cannot be disputed. There is a good variety of openings, mostly standard, although with a few exotic lines. Middlegame play is excep-



On loading the program, the first thing to do is switch off the speech



You can play it any which way you like

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zenon (zen', zen'on) a zero-valent element (Xe; atomic number 54), a heavy gas present in the atmosphere in proportion of 1:17x10E7 by volume.
technology (tek'n-o-lo'ji) the application of practical mechanical sciences to industry or commerce.
xenon technology (zen'on tek'n-o-l-lo'ji) the best definition!

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tionally good. The program seems to be able to calculate much deeper in the time given than its rivals, and the Variable Draw option gives you all types of play from speculative to dull.

Endgame play is even more impressive. Looking at the demonstration games on the disc, it is surprising how often its opponents hold their own until the latter stages of the game and are then ground down relentlessly.

My tests showed that Chess Player 2150 could calculate 12 ply (half-moves) whereas my Fidelity Designer Excellence, a dedicated chess computer with a 6502 processor, could only manage seven or eight in the same time. Even allowing for the 16 bit processor's extra power, this is a significant difference.

The disc has all 30 games of three matches CP Software arranged between Chess Player 2150 and Chessmaster 2000 (it won 9-1), Chessmaster 2100 (it won 6½-3½) and Colossus Chess X (it won 9½-½) ready to play through and analyse.

I find it odd that, although the Swedish grading list issued last June showed that Psion Chess was the strongest microcomputer chess program at that time, with a statistically verified grading of 1925, there was neither a Chess Player 2150 vs Psion Chess match on the disc nor a match with any of the 15 dedicated chess computers placed above Psion Chess in the list.

My test results at 30 to 45 seconds per move, the same as CP's tests, came out like this:

Colossus Chess X: *(Estimated grading 1600, advertised 1850)* **5½-½**
Sargon Chess III: *(Estimated grading 1650, advertised 1983)* **4½-1½**
Chessmaster 2000 *(Swedish grading 1693, advertised 1990)* **4½-1½**
FDE Computer *(Swedish grading 1833, advertised 1987)* **5-1**
Alastair Scott *(Scottish grading 1770, advertised 1770)* **4-2**

With all these numbers flying around, I estimate Chess Player 2150's real grading at approximately 1900-1950 and state, without proof, Uncle Alastair's Law for Chess Program Adverts, which cuts through the mists of claims and counter-claims: *Actual grading = Advertised grading minus 400m*, where *m* is the phase of the moon (0 to 1) at the time of reading the advert.

Seriously, until someone takes all the commercially available chess programs and chess computers and sticks them in a room with an equal number of graded players of all abilities in order to play a gigantic tournament, all the claims, of varying degrees of exaggeration, about playing strength should be suspended. The results, however, speak for themselves: Chess Player 2150 thrashes both myself and the opposition.

If you want an example of what Chess Player 2150 can do, try replaying its eighth match game with Chessmaster 2000, which is a beautifully played endgame with a striking finish. At 79 moves, it is too long to reproduce here. Again, it shows how far Chess Player 2150 can look ahead in simplified positions.

REPORT CARD

Chess Player 2150
Oxford Softworks 0993 823463
£24.95

GRAPHICS..........
A little blocky, but this is the best 3D board of all.

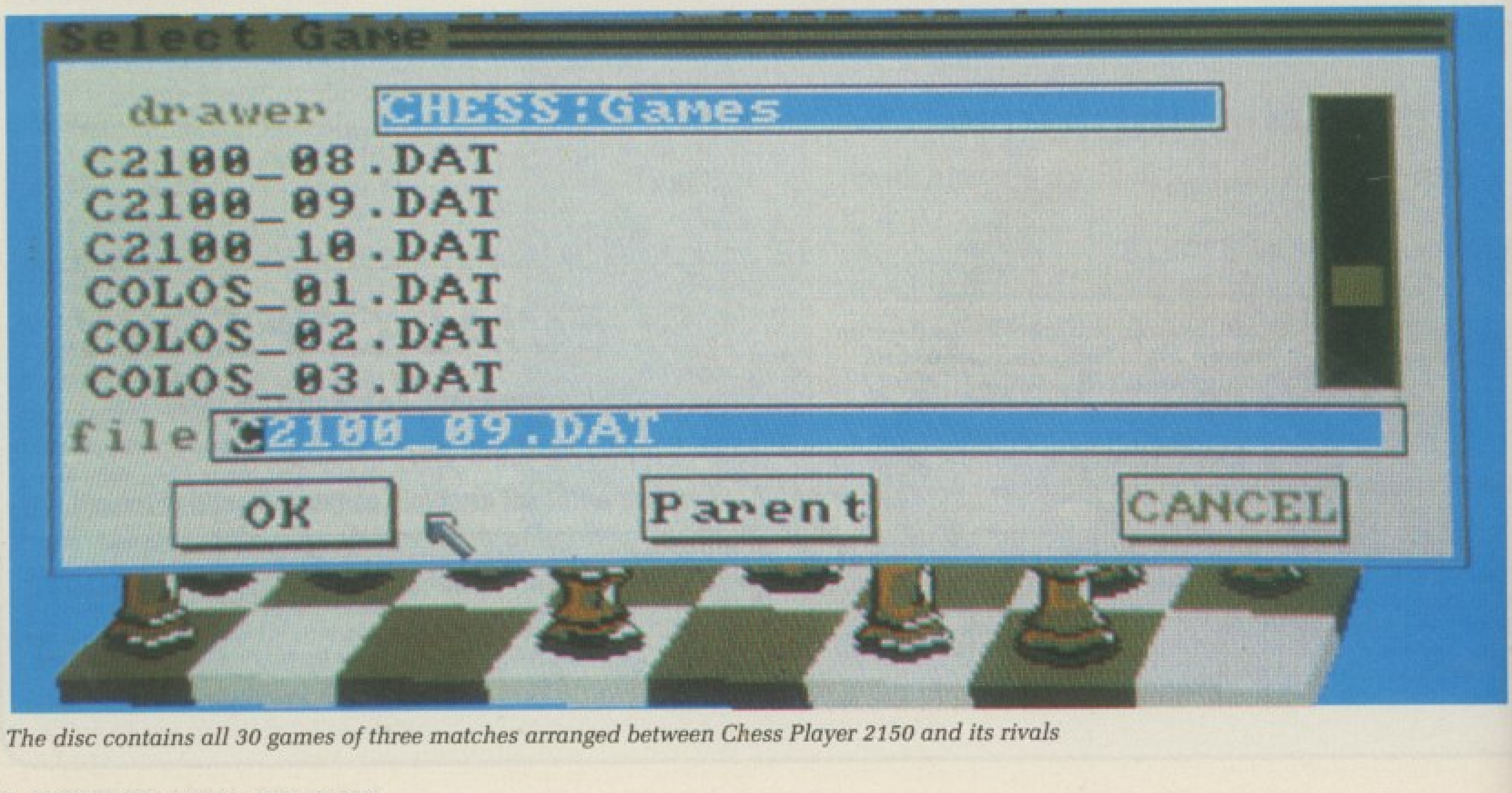
PRESENTATION
Not quite as good as Chessmaster but more than adequate.

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Access

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The ram forgets



FIRST there was RAM: then there was RAD: now there is DM0:. While the original ram disc has the advantage of growing to accommodate more files, RAD: does not forget its data when you reset the machine. Unfortunately nothing can survive a flick of the mains switch.

Until now. The German company Combitec has developed a device which can be used like RAD: but which survives your big toe snagging the power cable.

To perform this trick needs special ram chips. Normal dynamic ram (Dram) stores its information in a capacitor. This is a component which holds electricity like a little battery. If there is some electricity in the capacitor, it is set to a binary one, if not it is a binary zero. Unfortunately capacitors leak, so Dram has to be topped up all the time.

Some computer circuitry has the boring job of checking all the ram in the computer and topping up all the bits which are set to one. This little nudge from the computer every now and then, which allows it to remember what is in ram, uses a fair bit of power.

THE Combitec unit uses static ram (Sram) which stores its information in a pair of transistors. These need minuscule amounts of power to hold the information, and no topping up. The memory only needs a squirt of electrical juice when the value is changed. And since only one location is changed at any one time, this isn't very often. When everything is switched off nothing changes, so very little current is needed to retain the contents of the Sram.

Static ram does have some problems. The two transistors for each bit are much bigger than one capacitor. Remember we are talking about components which are made using a reduced photograph and are so small they need a large microscope to see. But "bigger" is a relative term and two transistors are a lot bigger when you have a quarter of a million of them.

As a result, the chips are larger and you need more of them. Such devices consume more silicon, and so cost more. Sram is also very sensitive to static electricity, so greater precautions have to be taken in manufacture and storage than with Dram. Static ram is expensive. The Combitec comes in two flavours, a 512k version for £279 and the 1 meg version, reviewed here, which costs £429.

The whole unit plugs neatly into the side of an A500 with a through-bus so that further peripherals can be added. Combitec hopes you will use this for its hard disc.

There is a power socket which allows you to keep the memory active for as long as the mains supply lasts. Most users won't need this because the principal method of providing power to the ram is through some huge capacitors.

This turns the problem of leaky capacitors into an advantage. The gentle flow of escaping electrons is

that never



Early computers used small magnetic cores to store data. Unlike today's micros they held the information without using any power. Simon Rockman looks at an Amiga peripheral which shares this useful property

enough to keep the memory happy. The capacitors take their charge from the computer and will hold enough current to last the memory a couple of months. To get the capacitors fully filled you will need to leave your Amiga on for 20 hours. After that your data is safe.

You can even unplug the ram pack and take it round to a friend's house where, if you plug it in straight and carefully, it should be possible to read the contents back. Not a reliable method of data transfer, but a neat party trick.

More use is the trick of auto-booting. With Kickstart 1.3 it is possible to boot an Amiga from any external device, providing it has suitable roms. The Combitec Sram has them. So you can load all the necessary bits of AmigaDos into the DM0: device.

Booting from this takes about 10 seconds. Booting from an A590 takes more than twice that. For a floppy user, booting from ram is like a dream come true, but then if you can afford the Combitec unit you might be better off with a hard disc.

THIS is an interesting product, but will probably only find a home in a few select applications. A showroom might want to hold a program in the static ram which runs from boot-up.

Whereas a disc left in the drive might become corrupted or be stolen, the solid state ram disc is safe. It is ideal for turnkey systems, which only ever run one program.

With a similar price to the cheaper hard drives, it is difficult to justify the cost of the Combitec. A hard drive is slower, but it offers 20 times the capacity and you can easily add up to 2 meg of system memory.

The best thing about the Combitec Static Ram unit is that it exists – it opens up new possibilities for selling A500s to users with specialist needs.

REPORT CARD

Combitec 1 meg static ram
Amiga Centre Scotland 031-557 4242
£429

EASE OF USE...
Simple to set up thanks to the power of AmigaDos. Documentation is one A4 sheet in German.

SOFTWARE.......
The unit comes with a boot disc which is set up for a qwerty keyboard, but otherwise it is simply a matter of clicking on one icon.

SPEED.............
Very much faster than a hard drive. Can be configured as a ram disc or as system memory – good if you run a few memory hungry programs but want speed most of the time.

VALUE.............
The basic component cost means that the whole thing is too expensive.

OVERALL 65%

An interesting add-on which most users could find a great benefit, but at a price which severely limits its appeal.

Hi. I'm the new mail man. Man. It's my job to sort your scribblin's and spill the beans on the problems we all have when DF0: starts to whirr. So if you've got something to say, say it to me. The best letters will be sent prizes of up to £100, so get a copy of Protext into your drive pronto. Drop me a line at Ezra Surf's Postbox (ESP), Amiga Computing, Second Floor, North House, 78-84 Ongar Road, Brentwood, Essex, CM15 9BG.

Ezra



Miserable Midi

SOME months ago, in response to an advert in your magazine, I bought a Midi Interface from Datel Electronics. My intention was to use it with Deluxe Music Construction Set software. I have failed miserably to get it to work.

So I wrote to Datel seeking advice. Despite the sae enclosed I got no reply. Undaunted I wrote again - still no reply. Now it may well be that Datel is entitled to say £35 doesn't entitle you to advice" but at least the return of the sae saying so would have been polite.

Contrast this with the manufacturers of DMCS (Electronic Arts). When I wrote to them I got a letter back by return of post but still my set up Yamaha DX21 to DMCS Amiga will not work. Can anyone out their help or should I send it back to Datel? If I do will I ever see it again? On a lighter note I have access to an Epson LX80 with an IBM/AT cable. Do I need an Amiga cable to use it?

Andrew Shand,
Ayrshire.

Hey, don't lay the heavy "it's your fault, the advertiser was in Amiga Computing *bit on me. If someone pays for their bit of the magazine they can say what they like. Legal, decent, honest and truthful of course.*

It's good of you to realise that support costs and that the profit Datel makes on a £35 interface doesn't really allow much scope for them to help you. As this is the interface Commodore has chosen to bundle with the education pack it must be a pretty good buy. Although there is one incredibly naff thing in that pack – you can always throw those magazines away.

I'd say your interface is broken. Send it, together with photocopies of whatever paperwork you have, back to Datel and ask for it to be repaired or replaced. You only need a special printer lead if you have an Amiga 1000, otherwise an IBM cable is tickerty-boo.

Getting better

I AM saving up to seriously expand my A500. Firstly I would like to expand the ram. I had considered adding an A501 or equivalent and the Microbiotics Starboard2 added onto their Starboard 2/500. Are the Starboards fully populated for the £225? Is there a better/cheaper way to do this and how can I attain the maximum of eight megabytes?

Secondly, which would be the best money/performance way of adding an accelerator that would speed up Sculpt Animate 4D or 3D-Animate? Would the CMI accelerator work with 4D or would the CSA Turbo be better? I am not worried about any battery backed up clocks or the Starboard2 add-on modules, just value for money coupled with performance. Could you give me £999 for a Triangle Turbo 3 100meg hard drive?

M Allum,
Bury St Edmunds,
Suffolk.

ERM, I seem to have left my wallet at home. All this ram and a processor board is going to cost you over £1,000 and be a real mess of power supplies, cables and may give trouble. If you are serious about expansion you ought to go for an A2000.

The most powerful processor is the A2620, although I've heard rumours that the even more powerful A2630 is already on the production line. The system to go for is an A2000 with an A2630 processor card and 4 meg of 32bit ram and to use the 2091 hard disc controller which has space for 2 meg. This will give you a super-fast 7 meg system. You could then squeeze the last 2 megs in with another card.

The only A500 accelerator which got a half-decent review was the Third Coast one in our November issue. If you want to stay with the A500 – and if you are serious enough to spend £400 on the Sculpt software I think this is a mistake – avoid the processors and settle for an A590 or the cheaper Triangle Turbo drive with 2 meg in it and a 2 meg internal expansion from either Club 68000 or Memory Expansion Systems.

This will give you a 4.5 meg system which should be plenty. In the Amiga Computing *office we have one, three and five meg systems. For normal applications three meg has always been plenty.*

Name that tune

I WAS really impressed with your excellent *Amiga Computing* demo, and immediately dashed out and bought the Devpac V.2. assembler so that I could have a look. However, I realised to my dismay that the music file source:tune is not included with the source on the September 1989 disc.

This somewhat nobbles the effectiveness of your spectrum analyser, so please would it be possible to either let me have a copy of the tune music data file or for you to produce another music file that is compatible with your source demo? I am quite happy to pay for the original music file, but wouldn't want to pay much because I only want it for testing your demo, not for any commercial propose.

Reg Knight,
Baldock, Herts.

You need a copy of Soundtracker – see last month's magazine for more details of this program. Kevin Collier is a professional musician and retains the rights to the source for his music. Jeff has some very special plans for some musical things on the disc, which may include the module you want.

Edit suite and sour

HAVING bought a pseudo A2500 for use in a professional Video Edit Suite I would like to warn prospective buyers of some problems.

It took three hard disc read/write errors and reformats before I read that the A2090a hard disc controller suffers from "severe timing problems" when used with

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a hi-res overscanned screen.

This is scandalous behaviour by Commodore, since one of the main reasons for the purchase of an A2500 is the 1 meg of chip ram enabling full 16 colour, hi-res, overscanned screens?

Not only that, but the flicker fixer and multi sync monitor do not work if the Amiga is genlocked (come back 1084, all is forgiven.) A ridiculous situation considering that the video industry must be a major market for the 1 meg chip ram Amiga.

Could you clarify the situation with an explanation of the many official A2000/2500 configurations. Which ones are guaranteed 1 meg chip ram etc? Plus any alternatives to the unacceptable A2090A.

And what news of an Amiga version of the 16 million colour Parsec graphic interface or Commodore's ECS?

And how about a dedicated 2000/2500 page or two to unveil these kind of problems. Both Commodore and my dealer have been particularly unhelpful on these matters.

Gordon Booth,
London SW15.

Tangled in technology my friend. The A2090a was designed before the 1 meg Agnus chip. You can either wait for the 2091 or go for the splendid Microbiotics Hardframe, widely held to be the fastest HD controller available. It is available from Oasis (on 01-859 4936).

The flicker fixer is designed to be compatible with multi-sync monitors. Genlocks have a very definite idea of what they want the sync rate to be.

Unless the world settles on a sensible standard for high definition television, which looks unlikely, I'm afraid we are always going to suffer this kind of problem. The alternative is to use dedicated TV hardware which is many, many times more expensive.

New A2000s should all offer 1 meg of chip ram. Sometime soon A500s will also get these. The Parsec graphic interface is being worked on, but it will need its own genlock – a standard Amiga one won't work.

You should be able to genlock a signal from ECS, but that needs Workbench 1.4 which looks a long way off. Some smart money says April.

Bent copper

I HAVE been an Amiga 500 owner for a least a year now. I use it mostly for programming in assembler. I started 68000 code by reading *Amiga Machine Language by Abacus*. I found this interesting though it discouraged programmers from using the hardware directly.

I wanted to learn more so I started reading the Amiga Hardware Reference Manual from Commodore. This is interesting but there were very few practical examples.

I read Jolyon Ralph's Copper tutorial in the September issue of *Amiga Computing*. The article was useful and easy to understand, though I tried the assembly language example but it did not work. I used Devpac 1.21 to assemble the code.

I ran the program from a CLI window, the background colour remained the same and the CLI window disappeared. the CLI window was restored once the left mouse button was pressed.

According to the article the top half of the screen was supposed to be black and the bottom half red, but this was not so. I would be grateful if you could tell me of any mistakes I might have made. Could you suggest any books with better more practical examples that cover the whole of Amiga hardware?

Peter Trowe,
Iver, Bucks.

So it was you who bought that copy of Format. Well the version of Devpac they gave away won't put code in chip ram whatever directive you give it. You could take your A501 out and then the example would work. Or you could buy a better assembler (see special offers for a good deal on ArgAsm). Or you could use the Hunkfix option in Powerpacker which was on the October disc.

You've already got the main books. There is the System Programmers Guide from Abacus (definitely avoid the disc, it only works with the Abacus assembler) but none of them do the job properly, which is why we got Jolyon to write his series. It's good that so many people are enjoying it.

To take things further Jolyon recommends 680x0 Programming by Example, *by Kelly Bootle published by Howard W Sams & Co. He has also written the* 68000,68010,68020 Primer. *Neither of these are Amiga-specific but they are quite cheap at £14.50.*

Golden disc

IS it possible to connect a Philips CDV475 compact disc video player to the Amiga? If so where do I get Doomsday Book and other discs.

Ian Harper,
Hardingstone, Northampton.

Wow, I wondered if anyone bought one of those CDV things. They look really neat with those 8 inch golden discs, even if an ordinary CD does look a bit odd in that big drawer. The sad thing is that they are seriously limited when it comes to being interactive. The Doomsday Book only works with an expensive video disc player and needs a BBC Micro to drive it. Shame, it was a nice idea.

Family fortunes

SINCE watching the BBC Software programme earlier this year which featured several program for genealogy – I have been trying to track one down for my Amiga 500. Despite trying many of the companies who advertise in your magazine, I have failed to find anyone who had heard of such a program for the Amiga or who could tell me where to try and find one.

Nick Hinde
Gosfort, Newcastle.

George Thompson Services on 077-082 234 has a genealogy program. It's just like a bog end BBC programme to miss out the Amiga.

Depressing advice

THE mag is great, excellent features, reviews. But I've got to complain that due to your telling a reader iconx was available on Fish Disc 65 in Vol 2 No 3, I rushed out and spent several hundred pence of my available cash, only to find it wasn't there. I was flabbergasted you could make such a mistake and suffered a deep depression for 3.65 minutes.

Kevin Tate,
Belmont, Durham.

PRIZE LETTER

Narrow minded

WHY isn't the Amiga better known? I bought a modem and was having trouble with using a bulletin board. So I asked the sysop for help, telling him I was using an Amiga 2000. Displaying as much intelligence as a boiled potato, he asked if that was a PC or a modem.

Of course I explained that the Amiga is an advanced 68000 based multi-tasking system with graphics and sound processors which make the IBM look like a bad dream Sir Clive once had. But how do we get it through to the people in suits that the world of computing is much more exciting when you wiggle out of the big blue straight jacket?

Gerry Hall,
Kullybackey, Co Antrim.

Leo Schwab, an Amiga expert in California, has a great idea for evangelising the Amiga. Assuming you don't keep all your copies of Amiga Computing *(and if you do see the special offers page for a great deal on binders) don't throw them in the bin.*

Keep them until you go to the dentist, or doctor, optician or hairdresser and leave them there with the copies of Punch, Good Housekeeping and Forum, then other people can read about the wonders of the Amiga.

Of course if you were really dedicated you would buy several copies each month and distribute them in this way.

Drive to distraction

HERE's an interesting problem. At least I hope you think it is interesting enough to print, because otherwise I'm stuck.

I bought another disc drive, the one Evesham is advertising. Fired up with excitement I plugged it in and switched on. No problem at all, the new drive worked fine, as did the internal one.

It wasn't until the weekend when I used the computer for more

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than one boot that I noticed that the computer would only boot up one disc per session. If you reset and try to boot again you just get the familiar picture of a hand and a disc. I hope you can help, because I've taken to leaping up and down and scaring the dog because it is so annoying.

Andrew Cowper,
Amersham, Bucks.

Hmmm, strange Andy, the Evesham is our favourite external drive. Does the Amiga reboot properly when you disconnect the drive? What about when you switch it off? If everything works OK without the drive send it back to Evesham.

Rich approach

I HAVE quite a big problem, I have an old C64, which is useless for my purpose. Do you think that it would be better to buy an Amiga A2000 or a 2mb Amstrad? I hear that the Amstrad is IBM compatible and the Amiga is not. By the way I am going to use it for business not for games. I am sending this from Bulgaria. It must be a first.

Henry Mills,
St Albans, Herts.

Since you sent your letter on Hilton Hotel notepaper you are obviously very rich, so I'd advise you buy both an Amiga and an Amstrad. This will allow you to see how mis-guided developers are to write big, complicated software for such a poor machine.

Seriously, your best bet is to pop down the road to Watford and visit Y2 where they sell both machines and will sort you out. Call first on 0923 50161 and tell them I sent you.

PD CAD for PCB

HAVING just started a two year course in electronic-engineering, I was wondering if there was a PD CAD program that would enable me to design printed circuit boards. If there is such a program, would it run on an unexpanded machine?

If there is no such program available on PD, is X-CAD Designer the cheapest alternative? That and a ram expansion is a bit too much for a lowly college student like me.

Lastly, I would like to use a combination of paint package, video recorder and camcorder, to create pictures I can put on to videotape and also take off tape and print. Can you help?

Jack Martin,
Camberly, Surrey

PCBTool is the program you are after, it's not very good, but what do you expect for free? You can get a copy by asking Seventeen Bit Software for a copy of Fish 158. Call them on 0924 366982.

Chip fix

I WAS just reading your letter section about Mr Chi Chung Wong's problems with a presumably blown custom chip. I have experienced exactly the same problem has he described it, but since I was working with a program, and did not have time to send my Amiga to be repaired, I decided to fix it myself.

I have been working with many computers, and when some one of them breaks down it is usually because of bad contact between a chip and the socket. To solve this you only have to press the chip down again.

Consequently, I opened by Amiga and started to press softly on all chips. Voila, it worked! It was not a blown custom chip. This little operation saved me a lot of money and trouble, and it took less than five minutes.

However, it is important to notice that this will ruin your warranty. But it you do not have any warranty, and want to fix it without paying a lot of money for some new chips you actually do not need, it is worth trying.

Anders Bjerin,
Richmond, Surrey.

Disc dilemma

PLEASE could you help me, but first I would like to congratulate you. Your magazine is well written and your cover disc is brilliant. The problem is I've bought a 3.5in disc head cleaner recently but the instructions said command your disc drive to operate for at least 30 seconds. Please tell me what the command is to make the Amiga's external and internal drives to do this, if there is one.

Lance Palmer,
Pontefract, W Yorkshire.

Flattery will get you everywhere. Right, what you need is a program which takes control of the disc drive. Diskcopy on the Workbench will do. Run Diskcopy from CLI, then when it asks for a disc put the cleaner in. You'll get some errors but retry until the drive has had its 30 seconds. Do not over-use disc cleaners, they can screw up the heads.

Bigger and better

I AM considering a one meg expansion, but should I buy two megabytes, as quite soon games will exceed one megabyte? Already there is a PD demo which needs two megs.

Vivian Lawson,
Harrogate, N. Yorkshire.

Whatever they tell you, size counts, at least up to three megs. If you want to use multi-tasking the more memory the better. The same goes for applications like art, animation and ray tracing programs. I doubt that games will start to want more than one meg, there are only a few which need more than 512k. If you can afford it go for a two meg board.

Starting over

I WANT to start learning machine code on my unexpanded A500 but the software and books all seem to be for the expert.

Could you recommend a package? And how much would it cost? Where can you get a full memory map of the unexpanded Amiga 500?

Lauren Jones,
Fordingbridge, Hants.

Asking for a memory map shows that you have moved up from an 8 bit machine. The Amiga is a very different beast, things don't work in the same way because the memory map shifts around. To start with you will need an assembler, either Devpac or ArgAsm (see special offers). This will cost you £70ish.

Then you will need a book on 68000 assembler – see my reply to Peter Trowe's letter – and a book on programming the Amiga. Compute!'s Amiga Machine Language Programming Guide *is a good bet. All in all you are looking at £100.*

Who's bad?

COULD you please explain exactly what NDOS is, as when I insert my Virus game disc after loading Workbench the computer responds with a request and then calls the disc NSDOS.

Steven Godwin,
Finchley, London N12

Some programs, well pretty much every game, grab the Amiga by the electrons and take over. NDOS stands for Not Disc Operating System. This means it doesn't use the standard Dos which Workbench understands. You need to put such a disc into the drive when the Amiga hand appears.

Back-up blues

MY Workbench does not duplicate. The copy window is blank and the disc drive keeps going round but nothing else seems to be happening. It does not copy disc. I have only had this problem recently. All other functions of my computer have been working fine.

I tried VirusX (no viruses) I looked to see if the copy command is there, and it is. Could it be that my internal drive is corrupting the disc?

I have cleaned the head with the recommended cleaners but to date I have still had no luck in copying discs consistently.

On September 6 it copied one disc but since then it has returned to not copying again.

S C Claphoe,
Taring, Worthing.

Sounds like bit rot, a strange software problem, best cured by a new copy of the Workbench disc. It is unlikely to be hardware. You aren't trying to copy a protected disc are you?

No back-up

WARNING to all MicroEmacs users. The version of Memacs released with WB1.3 does not alter the archive bit on the file just edited. This means that if you back up your hard disc incrementaly any files edited using Memacs will not get backed up until you do the next full backup. Anyway, that's what happened to me.

Trevor Wood,
Lewisham, London SE13.

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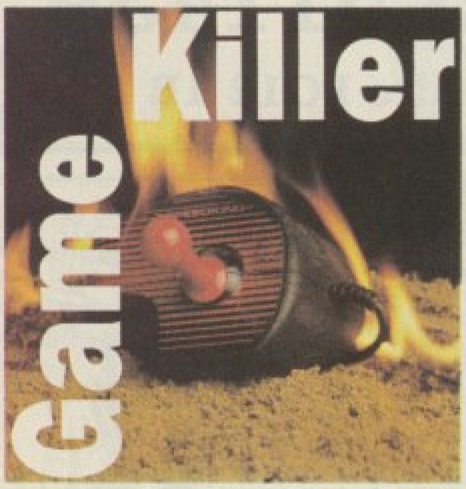


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Cheat & nasty

Max the Hax presents the collected wisdom of the greatest games players on earth – all of them Amiga Computing readers

Kick Off

PAUL BROWN says: Referees can be a pain at times. Zappa and Fernandez give out pretty coloured cards for you to collect. When taking corners always use the high kick.

This stands the best chance of scoring because either you put it in the net or an opponent will score an own goal, or the wind will score for you.

At throw-ins keep the ball away from the men near the line because they are likely to kick the ball straight off again.

Knowing the tactics different countries use can stand you in good stead for International games. Choose the USSR for your own team because they are the fastest. West Germany tackle hardest, so if you dribble in the



Batman

CHRIS WEBB says: Have you completed Batman – The Movie? I have. Here's a few tips which helped me on the way.

On level two, when driving the Batmobile try to slow down and go round the cars rather than hit them. This saves time. Take it easy for the first 50 miles. Then if you snuff it before you reach the end you re-start half way with half the time.

On level four take it easy when cutting the first 50 ropes to repeat the re-start trick. Use the shadow of the Batwing to line up with the lane the carnival is in.

While level one also has a half-way stage, level five has re-starts a third and two thirds of the way through. These tips, along with an extra life every 100,000 points should see you defeat The Joker.

STEVE METCALFE says: When you load the game wait for the loading screen with Batman and the Joker and type JAMMMMMM. Keep pressing the M until the screen flips upside down, then press fire. This will give you infinite lives. Pressing F10 takes you to the next level.

penalty area you might get some penalties awarded. Holland are a strong foe; try and keep possession. England try to shoot too often, while the rest are pretty average.

In general when you want to get the ball into your opponents' half run up to the ball in the direction you want to go, tap the ball at the same time pulling the opposite way on the joystick. The ball will be thrust high in the air and cover a good distance.

Try to dribble the ball a lot. If you are fouled you will earn more time, or your opponent will get sent off. The best formations are 4-2-4 and 5-3-2.



Phantasie III

MAX OLSSON says: To get more money and deposit some gold. When asked how much type 9999999. This is turned into 27009. Do not deposit any more money or your account will go back to nothing.

Federation of Free Traders

JOHAN LIST from Amsterdam says: Hello, I have a great tip. If you want to make a lorra money without using your laser you can play the markets.

Enter the Galnet computer and go to the trading section. Look up foodstuffs. It they are not available quit the computer until you are at the bay doors and try again. When some foodstuffs are offered buy as many as you can. The price will rise. Sell the lot at a profit and the price will fall. Buy them all again and the price will shoot up. You can keep doing this until you have built up a lot of money.

JULIAN SMITH says: To buy anything on the black market for one credit get an id number and then blast off. Enter the net, logon, press T and Return.

You should now be in communication mode with the alien. Keep him talking until he offers to trade. Make him an offer of one credit. He will tell you where to stick your credit. You logoff if he hasn't.

Now due to a bug everything you buy or sell will cost one credit. Great if you are buying, incredibly naff if you are selling.

So press T and Return to talk to the alien. When he offers to trade make a bid of 200,000 credits. He will say "insufficient funds" and logoff. Then when you next trade the items will change hands for 200,000 credits.



Write to Max

GAME Killer is always on the lookout for hot tips, so if you have found a cheat mode, bug or written a poke drop it in the post – on disc if it is a long listing.

If your work is used I'll send you a game drawn at random from the goodies box and a Konix Speedking joystick. To speed up getting the prize to you please cut out, photocopy or copy this form. It will be used as the address label to send out your parcel.

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I confirm that the information I have supplied is mine, it hasn't been published elsewhere and I haven't sent it to anyone else.

Send this form to Max "The Hacks" Tennant, Game Killer, Amiga Computing, Second Floor, North House, 78-84 Ongar Road, Brentwood, Essex, CM15 9BG.

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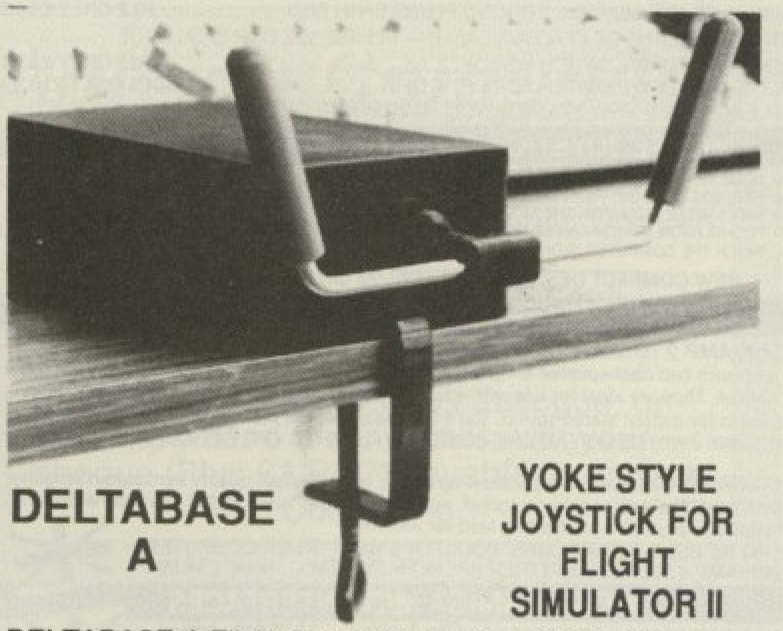
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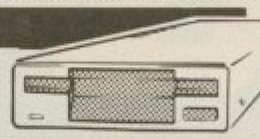


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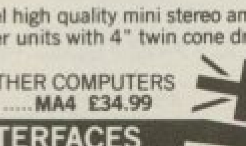
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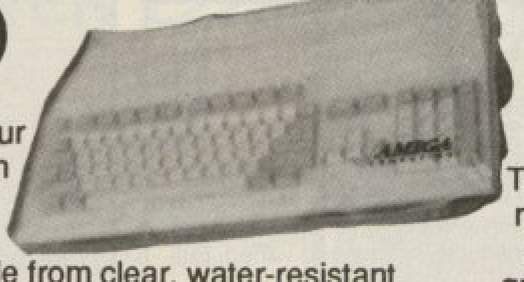
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Drivin' Force





Choosing out of 12 competitions is just one of the many choices you can make.



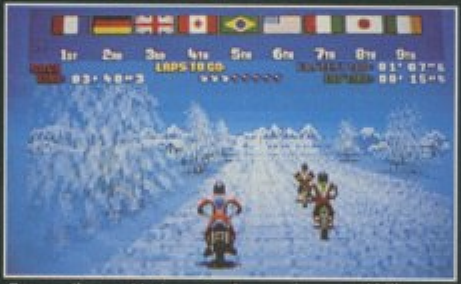
We'd forgive you for thinking you were in the Arcades.



Race in six completely different vehicles.



Each terrain totally alters your vehicles handling.



Race on the most tortuous tracks, over jumps and hills, as you attempt to beat your opponents to the finish.



Race throughout the day and into the night.

50 FRAMES PER SECOND!

Take part in twelve different competitions. Race in any of six vehicles, including a Jet-Ski for the bonus levels. Pit your speed, skill and endurance against the elements and eight other competitors in a hard fought battle for positions. Races take place on various terrains, affecting each of your vehicles in different ways. So throw caution to the wind and drive for all you're worth to reach your ultimate goal.

Drivin' Force runs in FIFTY FRAMES PER SECOND – the same speed as the fastest arcade machines – so go to your local computer shop and ASK FOR A DEMONSTRATION, better still — BUY IT!

- ☐ Six pieces of driving music
- ☐ 12 different competitions
- ☐ 50 frames per second
- ☐ 30 different tracks
- ☐ No disc swapping (950K on disc)
- ☐ 6 different vehicles
- ☐ 5 varied terrains
- ☐ Practice option
- ☐ Choice of country / male or female
- ☐ Joystick or mouse control
- ☐ 8 opponents

AVAILABILITY: AMIGA £24.95 November '89
ATARI ST £19.95 February '90

ASK YOUR STORE FOR A DEMONSTRATION

TO ORDER NOW
051-423 5943

VISA

Digital Magic Software

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